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ABSTRACT

Included in this report is a description of the Outdoor Natural Science Laboratory and activities conducted at the laboratory, evaluation of activities of teacher-naturalists, evaluation of a teacher workshop, and analysis of field trips. The analysis of the field trips included process analysis data and data obtained from questionnaires completed by elementary teachers regarding utility of field trips, general management of field trips, effective concerns associated with field trips, and management and utility of Outdoor Natural Science Field Trips. The Field Trip Opinion Scale and item analysis data are appended. This work was prepared under an ESEA Title III contract. [Not available in hardcopy due to marginal legibility of original document.] (BB)

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OUTDOOR NATURAL SCIENCE LABORATORY PROJECT

RESEARCH REPORT II

SEPTEMBER, 1969

TITLE III, ESEA (PUBLIC LAW 89-10)
UNIVERSITY CITY SCHOOL DISTRICT
Ronald M. Compton, Director

Inquiry Into Innovations Series

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PART I

INTRODUCTION

The Problem

The Outdoor Natural Science Laboratory was originally conceived by its initiators as one method of meeting certain specific needs of suburban youth. These needs might be considered a "cultural deprivation" experienced by a strictly urban society.

Urban living represents a two-sided coin, with the many advantages on the one side often so pervasive to the urban dweller as to obscure the disadvantages of the other side. To the extent that this is so, children reared in an urban setting are often completely unaware of the ecological web of relationships in the natural community which have all but disappeared in urban settings.

University City is a residential suburb directly contiguous to the City of St. Louis. Furthermore, it is surrounded on the other three sides by other suburban communities. The land use of the city consists of apartments, duplexes, homes, small shops and shopping centers, newer high-rise luxury apartments, small, sylvan parks and express highways. The city has reached that stage where space does not permit further expansion, and present development is centering on urban redevelopment.

University City, along with the rest of inner suburbia, is caught within this urban-centered cultural milieu. A wealth of civic and aesthetic opportunities are available for the residents. These opportunities include: restaurants, museums, entertainments, professional athletics, a renowned zoo, botanical garden, planetarium, and the like. To the writers, the significant part of all this is what is lacking rather than what is present.

Although the opportunities available are impressive, they are, nonetheless, man-made creations. There is a noticeable lack of unaltered natural phenomena.

The children of the suburbs, and University City in particular, have lacked the opportunity to engage in critical and creative observation of natural phenomena. The community's children have been scheduled into such activities as ballet lessons, music instruction, Junior Theater, and adult supervised athletics. The attitude seems to have developed that one travels *through* the outdoors to go from one sphere of activity to another. This has resulted in a lack of critical awareness of the *real* natural community which constitutes a source of "cultural deprivation" for the children of the suburbs. Although they may or may not make use of the attractions available to them in the urban environment, they generally do not even have the choice to accept or reject the opportunity to study natural science at first hand.

The Outdoor Natural Science Laboratory

Purpose.

The Outdoor Natural Science Laboratory was developed as an innovative and exemplary way of teaching outdoor education or environmental science. Although there are a number of activities associated with the project, the center of the program is the 29 acre site lying adjacent to the north side of Ruth Park Golf Course and just south of the Olive Street Road business establishments.

Background.

In 1954, the only area of undeveloped land in the City was a rather large L-shaped section of Ruth Park. A 9-hole municipal golf course occupied the southwest corner of the park. In that year, Brittany Junior High School was constructed on the area immediately east of the golf course, leaving on the north side a long, narrow strip of relatively undeveloped hills and the River Des Peres flood plain that was too small for golf course expansion and too inaccessible for development. Mr. Rex Conyers, at that time a biology teacher, and Mr. C. I. Linhardt, of the City Park Department, saw an opportunity to utilize this land as a nature study area for the students of the community.

During the following years, interest in the site was maintained by small groups of administrators and teachers who took their classes on field trips to the area. The development of labeled trails and maintenance of the area was hampered by the lack of time, finances, and personnel.

The school district administration submitted a proposal for a planning grant for the development of the park area and a program for its use to the Federal Government during the spring of 1966.

The planning grant was made for the year 1966-1967. During this initial year, under the direction of Mr. Henry Kaltenthaler, a committee of about twenty teachers, including representatives from the parochial schools in the community, began to consider ideas for the use of the area and prepared the application for an operational grant.

Operational Funding began in July, 1967. The project staff was enlarged to include two teacher-naturalists under the part-time direction of Mr. Ronald Compton, who is also director of the Title III Demonstration School Project. The staff also includes part-time secretarial and maintenance-bus driver personnel.

Program.

The program of the Outdoor Natural Science Project, as it has developed over the past two years, has become diversified and encompasses several facets of the University City School's program. The program activities have been created, developed and performed by Mr. Henry Kaltenthaler and Mr. Robert Dwyer, the teacher-naturalists. The activities include:

1. Student instruction through field trips.
2. Teacher instruction through inservice workshops.
3. Camp consultants for the sixth grade through developing activities and materials for nature study, and serving as nature specialists at camp.
4. Science material development through the collection, filing, and distribution of science materials.
5. Student and community enrichment of science experience through publicizing and conducting evening trips to Nature Film Programs sponsored by the St. Louis Audubon Society and the St. Louis Zoo Association.
6. Special summer school consultation through developing enrichment materials and guiding student field trips.
7. Improvement of Nature Study site through planting trees, developing Ruth Park trails, etc.
8. Preparation of written materials to support the above listed activities.
9. Serving as member of an area-wide committee concerned with improving environmental science education.

These activities are delineated in the following paragraphs.*

Field Trips. The basic student-contact program revolves around a series of field trips. These trips are designed to make the best possible use of outstanding local resources as well as provide content suitable for the elementary grade levels.

The trips are as follows:

Kindergarten: Because of the relatively short attention span of this age group, the activities at this level are oriented to the school area itself and are sustained by the classroom teacher who revives interest several times a year. In the unit *Watching Things Change,* the class is encouraged to establish a micro-nature center of about one-square yard somewhere on the school grounds. By returning to this area several times throughout the year to make observations, seasonal and/or other changes can be observed. *Learning Through the Senses* provides reinforcement of class activities designed to improve the students' sensory perception. With the teacher-naturalists as guides, the students explore the "familiar" school grounds to make new discoveries by sight, sound, taste, odor, and feel.

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*The activity descriptions are taken from unpublished material prepared by Robert L. Dwyer, one of the teacher-naturalists.

Primary I: The same sensory perception skills developed in Kindergarten are reviewed and strengthened, this time in the Ruth Park Nature Study Area. New discoveries such as the smell of sassafras, the taste of dandelion greens, the feel of elm leaves, or the presence of tiny animals on the woodland floor are made in a half-hour walk of about one-quarter mile in length.

Primary II: First tried at a higher grade level, *Seed Dispersal* has proved equally successful with this age student. Primarily in the fall and occasionally in the spring, students are guided into discovering the multitude and variety of seeds. On a trip to the Ruth Park Nature Study Area, the students are first shown and then encouraged to find for themselves the seeds along the roads and trails. Naming the plants or seeds is not considered important and full attention is devoted to the students theorizing as to how the seeds are spread. The various mechanisms are demonstrated whenever conditions permit.

Primary III: In order to make use of the winter months when the weather is unpredictable and often unpleasant, the third grade students travel to the Missouri Botanical Garden with its fabulous indoor Climatron. The students' attention is directed to the variation in plants brought about by adaptation to desert, rain forest and pond habitats. Students attempt to discern how plants in each habitat are able to obtain sufficient sunlight, moisture, food (soil), air, growing space, and support.

Grade IV: Using the indoor facilities of the St. Louis Zoo during the winter months, students make independent observations of the characteristics of a wide variety of animals in the unit *Grouping Animals*. On the basis of their observation, the students then begin to construct a classification system for the animals. "Rightness" or "Wrongness" in terms of the "standard" system is not the goal of the field trips. Any answer based on a system logical to the student is considered acceptable.

Grade V: The Unit *The Changing Community* which was a study of plant succession utilizing a transect for gathering data samples proved too destructive for the limited Ruth Park Nature Study Area. At this time the Fifth Grade does not have a specific unit although a geology based trip to Southest Missouri is under consideration.

Grade VI: The Unit *The Water You Use* takes Sixth Grade students on two field trips. The first is to the St. Louis County Water Purification Plant where the students observe the processes used in making Missouri River water drinkable. The second trip is to the St. Louis Metropolitan Sewage Treatment Plant where the necessary anti-pollution procedures are observed. In the classroom and on the bus trips the students are made aware of the vital role that water plays in a modern civilization and the necessity of wise use to insure that water in the desired quantity and quality is and will be available.

Preceding each field trip, a teacher-naturalist visits the classroom for about a one-hour session to orient the students to the field trip and provide them with some of the basic background that they will need to understand what they see or do. The transportation time on the school bus is also utilized as teaching time by the teacher-naturalist, sometimes to review or provide additional information regarding the field trip and sometimes to examine the community through which the bus is passing in terms of social studies concepts.

Inservice Workshops. In addition to the field trip program, the staff of the Outdoor Natural Science Program has conducted three workshops in science for elementary teachers. The first of these was a two-week workshop in which a committee of teachers reviewed available science materials and began an outline for teaching ecology and electricity. The other two workshops, one week each, involved teachers in actually using some of the new curriculum materials being published nationally.

Camp Consulting. Teacher-naturalists served as resource personnel in planning for the sixth grade school camp. This role included acting as consultants and developing activities and materials for nature study. At camp, they acted as a part of the staff and specialized in nature-oriented activities.

Science Materials. The Outdoor Natural Science Laboratory Project has accumulated science textbooks, curriculum materials, library reference materials and files of other outdoor project materials as well as free and inexpensive materials for science. This library is available for teacher reference.

During the 1967-1968 year of operation, the project furnished all necessary materials to grades two through six for units developed by Elementary

Science Study. A series of three brief workshops (two after school and one released afternoon) were conducted for each grade level for the purpose of introducing the teachers to the materials and providing consultation on teaching methods. The project also provided materials for the first three levels of *Science--A Process Approach* to three schools for trial teaching and evaluation.

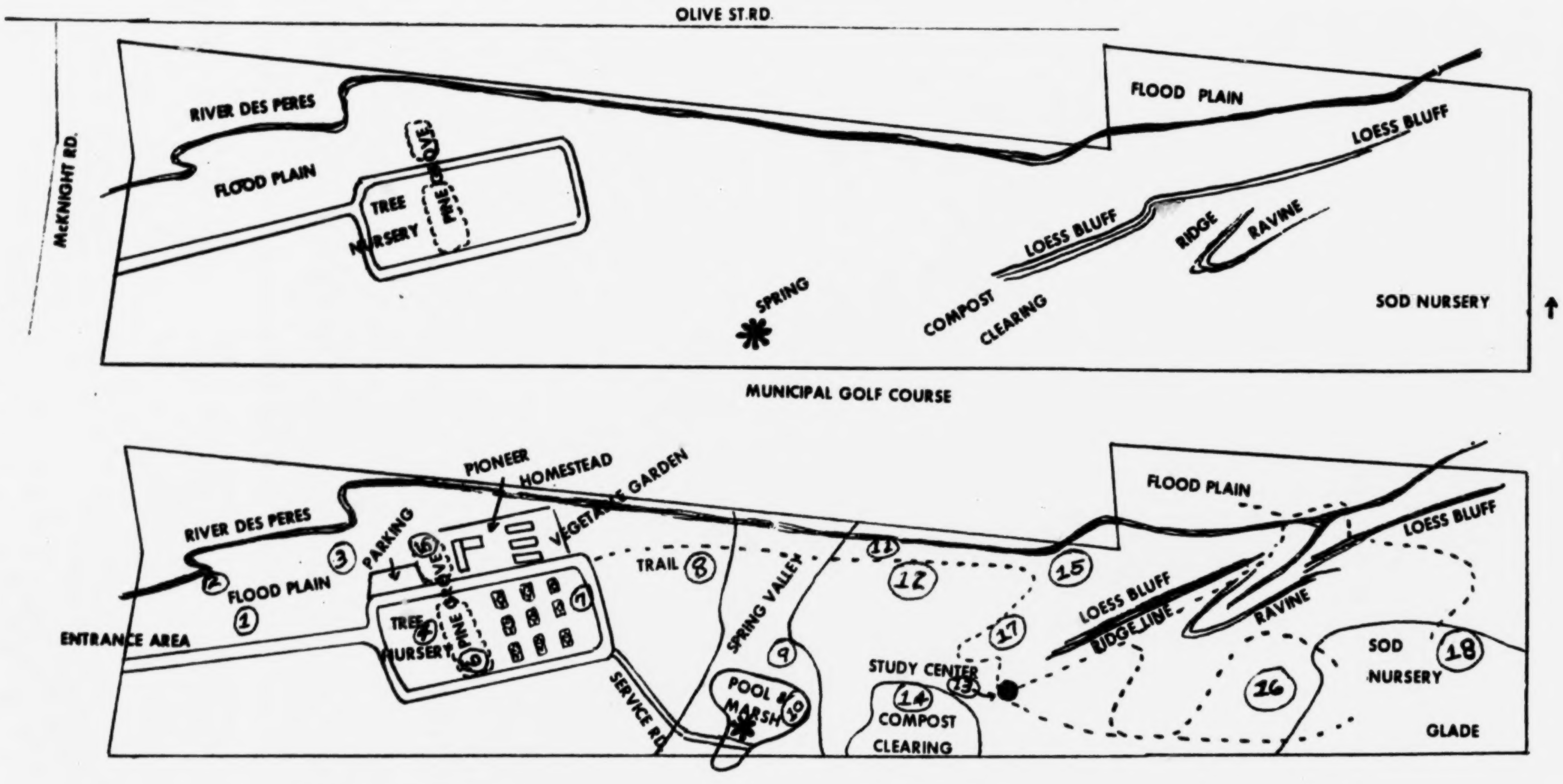
Nature Film Programs. During the 1968-1969 year of operation, the project has made free transportation and supervision available to fifth grade and above students, their families, and citizens of the community to Nature Film Programs sponsored by the St. Louis Audubon Society and the St. Louis Zoo Association.

Summer School. The project provided a teacher and materials for a summer school class in elementary science for fifth and sixth graders during the summer school term of 1968.

Site Development. Work in the development of the Ruth Park Nature Study Area has consisted of planting 2,000 pine, oak, walnut, dogwood and redbud trees, and laying out and constructing trails and bridges. The present stage of development can be noted in Figure 1.

Publications. Written guides and curriculum materials have been prepared for each of the field trips mentioned earlier. The regularly published guide to free and inexpensive science teaching materials that was distributed during the first year of operation assumed an irregular status during the second year. A series of bulletins is also published on an irregular basis for school camp teachers and directors.

Committee Membership. The teacher-naturalist staff is part of a committee of personnel from the educational departments of the St. Louis Zoo,


OLIVE ST.RD.
McKNIGHT RD.
RIVER DES PERES
FLOOD PLAIN
TREE NURSERY
PINE GROVE
SPRING
COMPOST CLEARING
LOESS BLUFF
RIDGE
RAVINE
FLOOD PLAIN
LOESS BLUFF
SOD NURSERY
MUNICIPAL GOLF COURSE
ENTRANCE AREA
RIVER DES PERES
FLOOD PLAIN
1
2
3
PARKING
5
PINE GROVE
PIONEER HOMESTEAD
VEGETABLE GARDEN
TREE NURSERY
4
6
7
TRAIL
8
SPRING VALLEY
9
SERVICE RD
POOL & MARSH
10
11
12
STUDY CENTER
13
14
COMPOST CLEARING
15
17
LOESS BLUFF
RIDGE LINE
RAVINE
16
FLOOD PLAIN
LOESS BLUFF
SOD NURSERY
18
GLADE

1. *Black Locust Grove*
2. *Stream Meander - Active Erosion*
3. *Shade House*
4. *Tree Nursery*
5.) *Managed and unmanaged Pine Plantings*
6.)
7. *Compost Pile*
8. *Bird Feeding Station - Orientation Area*
9. *Proposed Pond Site*
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11. *River Des Peres Trail - Dumping & Pollution*
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14. *Persimmon Grove*
15. *Dutch Elm Disease Loss*
16. *Crabapple Thicket (Succession)*
17. *Contour Trail*
18. *Sod Nursery*

Figure 1. *Ruth Park Wildlife Area as it is now and as it is projected as an outdoor natural science laboratory.*

Missouri Botanical Garden, Museum of Science and Natural History, Art Museum and Missouri Historical Society. Meetings of this group are held on an irregular basis to discuss common problems and concerns and apply group thinking to their solution.

EVALUATION

The director and the teacher-naturalists requested the research component of the Special Projects Office in University City Senior High School to turn some of its attention to the Outdoor Natural Science Laboratory Project during the 1968-69 school year.

As the investigators examined the workings of the Project and observed the Program in action, they became aware that there are a number of elements which lend themselves to quantitative measurement which would produce a score and upon which an evaluation based on such measures could be made. On the other hand, there are other elements which are more subtle and contain qualitative dimensions and do not really lend themselves to quantitative techniques. Such elements are "teacher-pupil relation" and "classroom climate or tone." In this report, an attempt will be made to show both types of elements.

When an investigator ordinarily attempts to make an estimate of the *"effect"* of a program or experimental treatment, he attempts to obtain a measure of the students or teachers before the treatment and a comparable measure after the treatment. In a gross sense, the change score would be considered to be a measure of the effect or impact of the program. This method is difficult to apply to the ONSL Program for the reasons discussed below.

As was previously noted, the activities of the teacher-naturalists are extremely diversified, touching upon many of the students and teachers in the school district; however, an in-depth concentration of activity does not exist for any group or level. For example, field trips are provided for most grade levels with a single experience designed per level. Furthermore, participation in the provided activity is voluntary. Therefore, most classes will have contact with the program only once during an academic year, with some classes not participating at all. The behavioral changes in students due to this particular experience would, at best, be subtle and extremely difficult to detect.

In time, as the program becomes more established, it could be expected that students with yearly natural science experiences at succeeding grade levels would exhibit measurable behavioral changes due to these experiences. As it stands at this time, these experiences are so diffuse that an attempt to measure them would yield an insufficient return. Any research in this area also would be obscured by the facts that some of the field trips were initiated for the first time this year, other field trips have been moved to a different grade level than that which was originally planned, a standard experience has not been provided for large groups of students, and the participation in the program by a class may be dependent on the teacher's attitudes toward field trips in general and toward science in particular.

This evaluation consists of four major segments. The first of these (Part II) is an examination of the flow of activities performed by the two teacher-naturalists for the past year (July, 1968 to June, 1969). This was done in order to explicate the activities performed under the auspices of the project within a time dimension. This investigation yields time-efficiency information. Inasmuch as the activities are performed by two persons, such data points up periods in which their efforts might be over-extended and the converse, either of which might impair the effectiveness of the project.

Part III consists of an evaluation of the third teacher training workshop which was held during the Fall semester of the 1968-69 school year. The evaluation instrument was designed by the investigators and filled out by the participants following the final session of the workshop. This yielded data reflecting both the quality of instruction and the relevance of the material presented.

Since the main thrust of the project is the field trip instructional program for the various grade levels, a measure of the impact of the project is the student and teacher involvement with these trips, at appropriate grade levels. This involves analyses of both the frequency of teacher utilization of the trips and numbers of student instructional hours given to outdoor science instruction. Such a study forms Part IV of this report.

A major emphasis of this project has been the mode of instruction emphasized within the field trip experience. It was pointed out in the original project proposal that the major concern was with the *process of learning* in the natural setting and not merely rote memorization of specific plants, wildlife, etc. No evaluation of this project would be complete without attempting to research this aspect of the field trip experience. Accordingly, Part V of the evaluation consists of an intensive behavioral process analysis of a field trip.

Inasmuch as the operation of this project is outside the classroom, and since it is dependent upon teacher self-selection as a participant in the field trip instructional program, the teachers' attitude toward the utilization and management of the ONSL field trips is a critical determinant of the effectiveness of the entire project. PART VI of this report consists of the analyses of a questionnaire designed to measure teachers' attitudes toward field trips as a general mode of instruction and the ONSL field trips as a specific body of field trips. This part also contains additional analyses of the relations between selected teacher characteristics and attitudes toward, and participation in, the ONSL field trips.

Part VII consists of a report of an analysis of the items making up the test instrument used in the study described above. This analysis represents a logical extension of the investigation into the interrelationships between teacher variables and utilization of educational field trips provided by ONSL personnel. By presenting both correlative analysis and item analysis for the same data, those interrelationships may be systematically described in a more complete fashion than would be possible by utilizing a single mode of analysis.

PART II

ACTIVITIES OF THE TEACHER-NATURALISTS: AN OVERVIEW

Mention has been made of the diversity of the teacher-naturalists in the performance of the activities required to carry this project forward. These activities cluster around the primary objective of providing meaningful outdoor educational experience to the school children of University City. This requires at least a four-pronged approach: 1, planning meaningful field trips; 2, teacher training; 3, curriculum writing; and 4, park development. Supporting activities designed to enhance overall understanding of environmental science include: 1, camp consulting; 2, on site nature specialists for sixth grade camp; 3, arrange Audubon tours; 4, advise a Junior Wildlife group; 5, serve as resource personnel for the school district's Summer Enrichment Center; and 6, continue their own professional growth through attending Outdoor Education and Conservation conferences.

These activities are summarized in Table 1 for the 1968-1969 project year. The table contains a breakdown of the activities performed during half-month intervals commencing with July, 1968 and ending with June, 1969. As can be noted from Table 1, the summer months saw the teacher-naturalists primarily engaged in curriculum writing in preparation for the coming school year. During July, they also served as resource teachers for the Summer Enrichment Center's science programs, including conducting a summer field trip program. During August, they led a teacher training workshop in which they presented modern science curriculum materials and methods.

With the beginning of the school year, they became heavily involved implementing their field trip program for grades K through 12. Because of the time of the year, they were necessarily involved in park site development; with planting trees and shrubs, marking trails, and generally preparing the

TABLE 1

FLOW OF ACTIVITIES, OUTDOOR SCIENCE TEACHER-NATURALISTS, 1968-1969

ACTIVITIES		July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
			Vacation No School				*Vacation - No School*						*Vacation - No School*
Summer School Resource		xx xx											
Advisory Jr. Wildlife Group										x	x		
Audubon Tours						x	x	x	x	x	x		
Develop Parksite					xxxxx	xx xx				xxxxxx	xxxxxx		
Convention Attendance										xxx	xx		
6th (Dir. Nature) Grade Camp. (Consulting)				x xx	x xx	x xx	x	x xx	x xx	x xx	x xx	xxxxxx	x
Teacher Training			xx			xxx	xxx			xxx			
Curriculum Writing*		xxxxxx	xxxxxx	xxxxxx	*aa*xxxx	xxxx*bb*	xxx	x*cccdg*	xx*eeeg*	xxxxx*g*	*fff*xx*g*	xxxxx*g*	xx
Field Trips by Grade Level	Sr.			x x									
	Jr.			x							x x		
	6			x x	x x						x x		
	5										x		
	4				x x	x	x	x	x x	x	x		
	3			x	x x	x x				x			
	2			x	x x	x		x			x		
	1				x	x x	x				x		
	Kg.				x						x		

TIME

*Letters refer to the publication of materials: *a, Classification; b, Learning Through the Senses; c, Zoo Guides; d, Ecology article in Grade Teacher; e, The Changing Community; f, Field Trip Preparation; g, Sounds From the Woods* park to receive students. During this time period, they were also engaged in camp consulting, curriculum writing and teacher-training. By the end of November, their first two curriculum publications, *Classification* and *Learning Through the Senses*, had been produced. As can be noted from Table 1 and Figure 2, these three months, September, October, and November form a peak period of activity.

During the winter months the density of activity diminishes somewhat. The field trips were limited to indoor sites, the St. Louis Zoo and the Missouri Botanical Gardens Climatron. These trips involve grades 1, 2, and 4. Curriculum writing and camp consulting continued through this period, with an occasional Audubon Film Tour. During this period five more publications were produced: *Zoo Guides*, *Ecology*, an article published in *Grade Teacher* magazine, the *Changing Community*, and two editions of *Sounds From the Woods*, a science newsletter devoted to preparing sixth grade teachers for camp nature activities.

The month of March saw a wide variety of activities including Junior Wildlife Group advising, Audubon tours, parksite development, convention attendance, further camp consulting, teacher training, curriculum writing, and field trips for Grades 3 and 4. A further publication of *Sounds From the Woods* appeared.

April represents a second peak period of activity with field trips for grades K, 1, 2, 4, 5, 6 and junior high. Curriculum writing continued, as did camp consulting, convention attendance, tours, and advising the Junior Wildlife Group. Parksite development was resumed in March and continued throughout April. This month saw the production of two more publications: *Field Trip Preparation* and another edition of *Sounds From the Woods*.

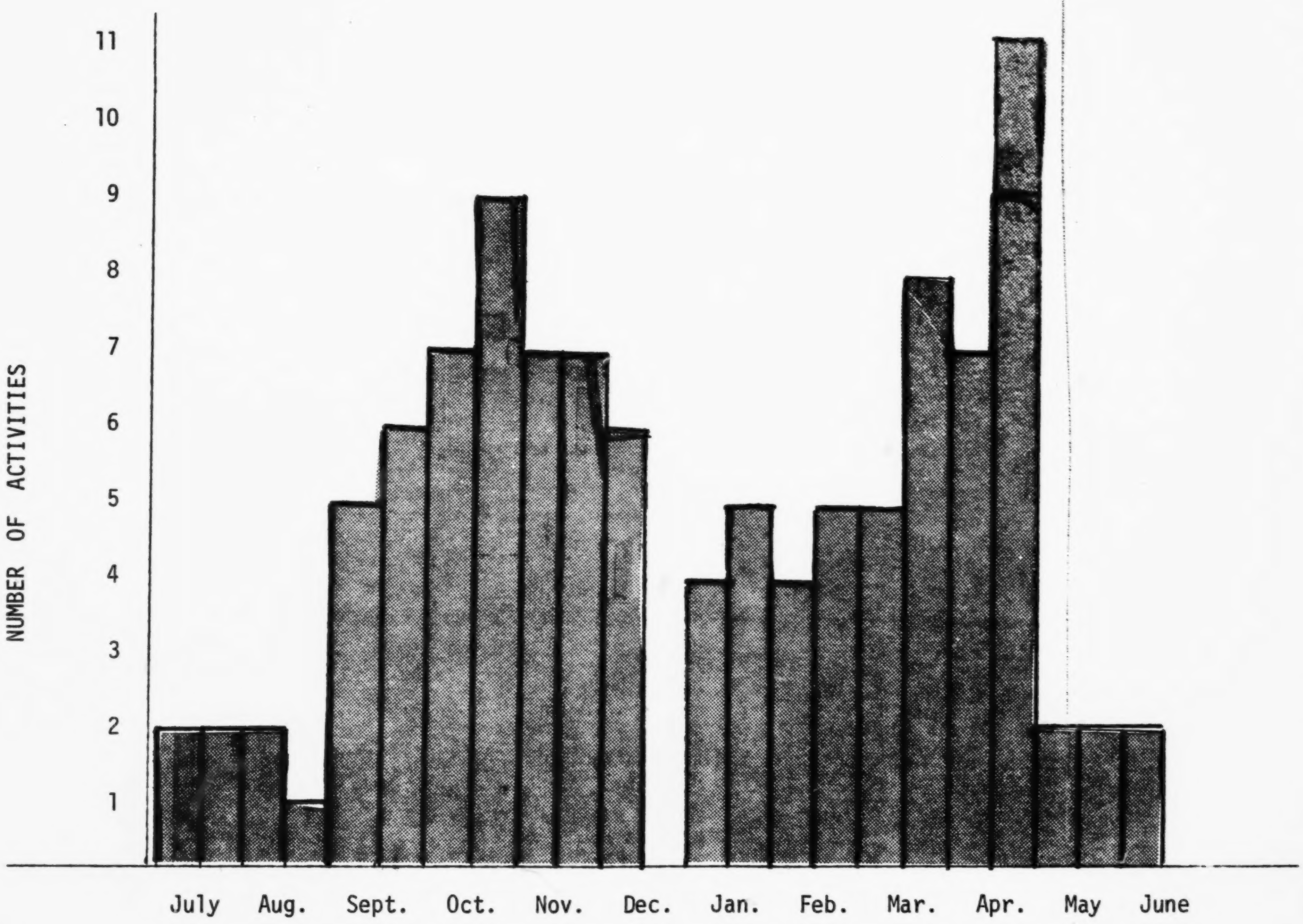

FIGURE 2: DENSITY OF ACTIVITIES, OUTDOOR SCIENCE TEACHER-NATURALISTS, 1968-69

The month of May was devoted largely to the Sixth Grade School Camping Program. Continued mention has been made of the teacher-naturalists' involvement in this Camping Program. Each spring, as part of the regular sixth grade curriculum, all sixth grade classes and their teachers spend six days at a campsite in a State Park. Outdoor Science being an integral part of this program, the two teacher-naturalists serve as resource personnel to the staff at the campsite. Curriculum writing still continued during this month with the final edition of *Sounds From the Woods*.

School ends in June, and the pace of activities slows down accordingly. Ordinarily, the first half of the month would include curriculum writing and camp consulting as well as preparation for summer school (The Summer Enrichment Center). The second half of the month marks the beginning of summer vacation, and the commencement of the cycle of activities for the coming project year.

Figure 2 shows the density of activities described above during half-month intervals. As can be noted from the figure, the fall months, particularly October and November, and the spring months of March and April are peak periods of activities. It can be further noted, that an extreme deviation of activity density exists between the low and high points during the year.

It might be assumed that increased effectiveness in the project might be obtained if a more even spread of activities were to be arranged. It is recognized by the researchers that some of this variation is a function of the time of year and the nature of the project. Although a perfectly even flow of activities cannot realistically be expected, curtailing some of the activities during the peak periods would logically be more parsimonious of the teacher-naturalists' time.

This should have the effect of enabling them to concentrate more heavily upon the primary objective of teaching outdoor natural science through field trip experiences.

Furthermore, this might become a necessity if they are to include uniform experiences to children at all grade levels (it can be noted in Table 1 that limited experience is offered to Grade 5 and to the secondary levels.)

There is a logical connection between the objectives of this Program and those of the Sixth Grade Camping Program. It would seem only natural, therefore, that the locus of the teacher-naturalists' activities should shift to the campsite during the month of May in order to support the nature program at camp. In view of the data presented in Table 1 and Figure 2, however, this concentration of effort upon one activity at a single grade level presents several implications which need to be considered.

The trend, beginning with the month of March and continuing into the month of April, indicates a rapid increment of field trip activities which would logically reach a plateau in the month of May. This is one of the prime time periods in which Outdoor Science activities involving school children of all grade levels would occur. According to the data presented, what actually occurs is a sharp curtailment of general field trip activity during this month with a concentration of activity at a single grade level.

The general plan of this project calls for the maximum development of general field trip experiences by the teacher-naturalists which can be, in time, replicated by the regular classroom teachers in the District. In order to accomplish this, they should be able to utilize the most propitious times of year compatible with outdoor activity. As things are presently operating, one of these "prime" months is devoted to a single experience for a single grade. This has the effect of compressing the multigrade activities into a shorter time period than the length of the school year allows.

If this is, in fact, a source of concern, then it would seem desirable to seek a manner in which the teacher-naturalists could interact with the Sixth Grade Camp Program without dropping completely their general field trip instructional program for all the other grade levels.

PART III

TEACHER IN-SERVICE TRAINING WORKSHOP EVALUATION

Among the activities undertaken by the teacher-naturalists during the current project year was that of conducting in-service teacher training workshops in order to upgrade the teaching of science throughout the district. Twenty-four teachers were enrolled in the third workshop, which was held during the academic year.

This workshop was designed by Mr. Kaltenthaler and Mr. Dwyer to affect the way teachers in the District present science materials in their classes. The general method involved exposure to, discussion of, and actually working with selected science curriculum materials. There were three types of sessions: 1, workshop activity involving ESS, AAAS, SCIS, and Minnemast materials; 2, general sessions consisting of three formal presentations on the philosophy of science and current issues in science delivered by the workshop leaders and two guest speakers; 3, methods sessions consisting of nine separate projects designed to allow teachers to "work through" science problems much as would students in their classrooms.

The evaluation instrument was broken down into the following selections: 1, Teacher Ratings of the overall workshop experience and the three types of sessions; 2, Teacher Ratings on each of the four work-activity sessions; 3, Teacher Ratings on the three general sessions; 4, Teacher Ratings on the nine methods sessions; 5, Open-ended questions regarding the experiences which were considered to be of most value and of least value associated with each session and with the total workshop. The mode of responding by rating was the following four-point scale:

4. has helped me a great deal in teaching science
3. has helped me in teaching science
2. has been of very little help to me in teaching science
1: has been of no help to me in teaching science

The evaluation instrument, consisting of a total of 26 questions, was responded to by 17 of the 24 teachers who attended the workshop. Since it was somewhat lengthy it was given to the teachers at the end of the final session with directions to respond to the items and return the questionnaire to the researchers.

General Ratings.

In order to obtain ratings on the general value placed upon the workshop by the participants, the following questions were asked:

1. Has the workshop as a whole been of value to you in teaching science?

2. Were the sessions on curriculum materials, (ESS, AAAS, SCIS, Minnemast) of value to you in teaching science?

3. Were the general sessions (Philosophy, concerns in science) of value to you in teaching science?

4. Were the methods sessions (observing, communication, objectives, etc.) of value to you in teaching science?

The median teacher ratings in response to these questions are presented in Figure 3.

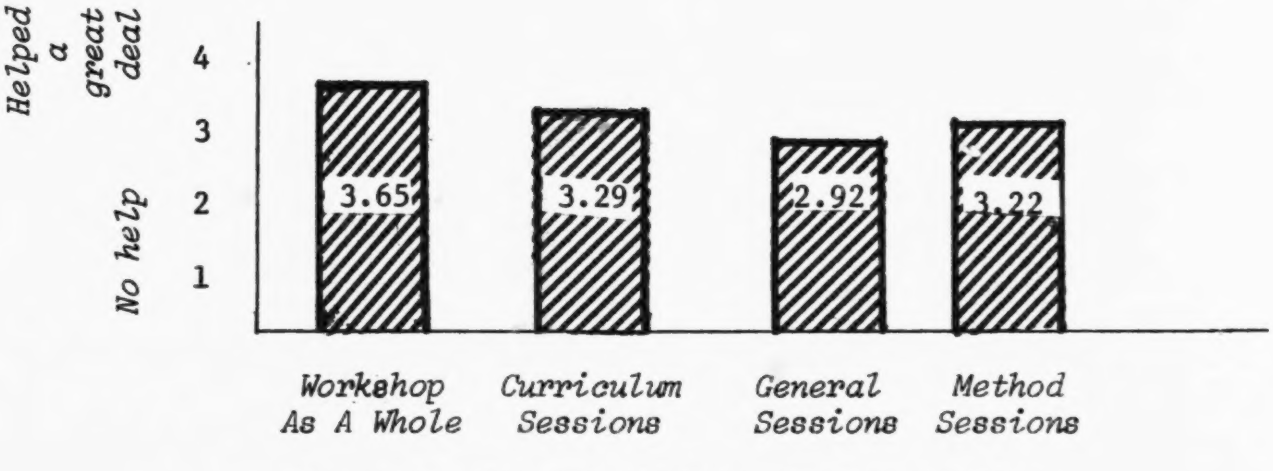

Figure 3. General Workshop Median Ratings.

It can be noted that the median responses to these questions tended to be quite favorable. The workshop as a whole was assigned a median response of 3.65 on the 4 point scale, which indicated that most of the teachers felt that the workshop had been of considerable help to them in teaching science. The median rating of 3.29 assigned to the curriculum materials sessions indicated that this, too, was of help to them in teaching science. Similarly, the ratings of 2.92 and 3.22 respectively, indicated that the general sessions and the methods sessions, too, were of help. It might be noted that the more formal general sessions presentations were assigned the lowest ratings. The last item in the questionnaire was, "Did this workshop fit your needs in teaching science?" Of the 17 respondents 14 responded by circling YES, 3 by circling NO, with one of this latter group not involved in the teaching of science in the classroom. In response to the question, "If we offer another workshop, should we include more advanced work for the same participants or repeat this program for a new group?" most of the participants indicated that this workshop was of sufficient value that it should be repeated until all teachers in the District had taken it, and many also indicated that they would participate in a second workshop providing more advanced work.

They were also asked to indicate which parts of the workshop were of the most and of the least value. The most typically mentioned activities which were considered to be of most value were the exposure to new ideas and materials and actually working through problems on their own. Particular topics mentioned in this respect were those concerning discovery, evaluating material, and the presentation concerning, "Problems and concerns of teaching science". Particular topics mentioned as being of least value were the required readings and their discussion (this was mentioned by most participants). In addition, some participants remarked that too much time was often taken by one or two teachers concerned with their individual problems.

In response to items inquiring what should and should not be included in subsequent workshops, the tenor of the remarks indicates a desire for an even greater time allotment given over to the actual manipulation of science materials and correspondingly less time be devoted to readings. It was suggested that name tags be used to facilitate group interaction since this involves teachers from various parts of the district.

Ratings of Curriculum Materials Sessions.

The participants were asked to rate each of the presentations of curriculum materials in terms of the value they perceived each held out for their own teaching. As can be noted from Figure 4 the ratings ranged from a high of 3.43 on the 4 point scale for the ESS materials to a low of 2.60 for the Minnemast materials. None of the materials presented at the workshop were perceived to be of little or no value to the participants. The respondents were asked to indicate what parts of these sessions were of the most or of the least value. The greatest value accruing from the materials sessions was seen to be the actual manipulation of the materials, the examination of teachers' manuals, and the comparison of materials. The introductory sessions and the numbers of units deemed inappropriate to the teachers' grade level were typically mentioned as being of least value.

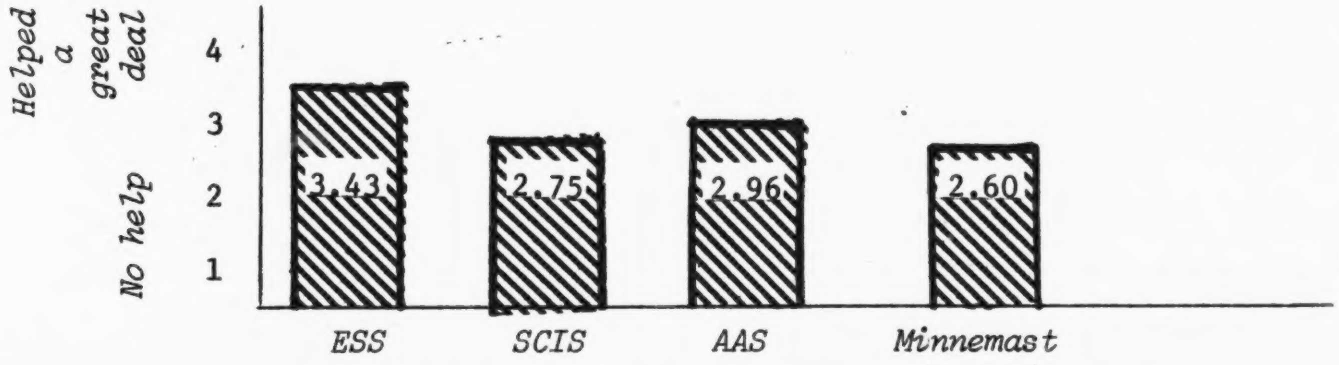

Figure 4. Median Ratings of Workshop Curriculum Materials Sessions.

Ratings of General Sessions.

The respondents were asked to rate each of the three general sessions in which a formal presentation was made to the group, followed by a discussion period. Figure 5 contains the median ratings assigned to each session. As can be noted, all three sessions were considered to be of help to the participants. The comments made in regard to these sessions referred to the generally high caliber of the presentations and to the amount of insight gained from them. In particular the first session was valued for introducing to the participants the notion of science as a process. Again the number and technical nature of the readings were looked upon as a drawback. The second speaker, Dr. Schatz, evoked the most intense responses, both pro and con. Most participants alluded to the exceptional quality of his presentation in that it challenged them to confront his ideas concerning issues in science. Mr. McConnell's was seen as a very interesting presentation. Several comments were directed to the lack of sufficient time for his presentation.

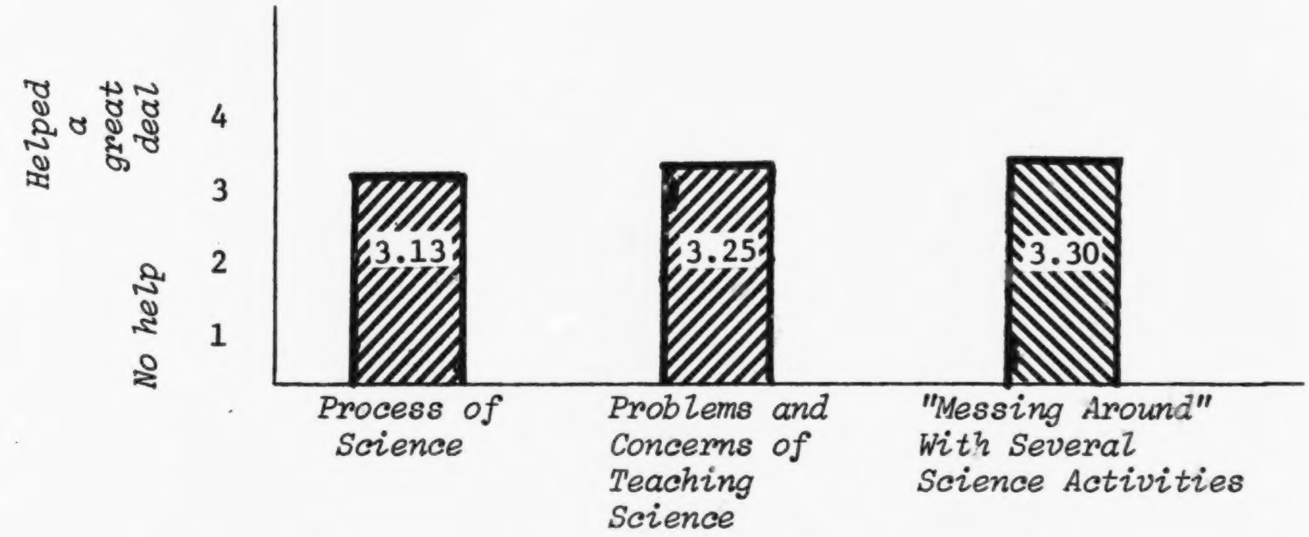

Figure 5. Median Ratings of General Sessions.

Ratings of Methods Sessions.

During the methods sessions, the participants actually worked through problems, and engaged in process-oriented activities much in the manner of students in the classrooms. There was individual and group work involving a high degree of interaction with each other as well as with the material. The two sessions receiving the highest median ratings were the introductory session, the "Messing Around" project, including 'batteries and bulbs' (3.70 on the 4 point scale), and the seventh session, "Process of Classifying", including identifying 'creature cards' (3.72). The lowest rating was assigned to the final session, "Process of Predicting", including graphing the rate of a burning candle (2.40). The remaining activities were assigned median ratings as follows:

(3.40) "Process of Inferring", including 'hidden circuits'

(3.25) "Process of Measuring", including clinometer and balance.

(3.17) "Process of Using Space-Time Relations", including symmetry.

(2.89) "Process of Observing", including metric system.

(2.88) "Preparing Instructional Objectives", including AAAS response sheets.

(2.79) "Process of Communication", including graph construction and probability.

Comments concerning these sessions were generally positive except for the final session, "Process of Predicting". The comments included remarks about the learning of new ideas, the involvement they felt in what they were doing, and the construction of their own experiments. The negative comments centered on the time factor. Several of the experiments required rather time-consuming constructions to be made before they could be performed, forcing the teachers to rush through them. This was the primary cause of concern with the final session.

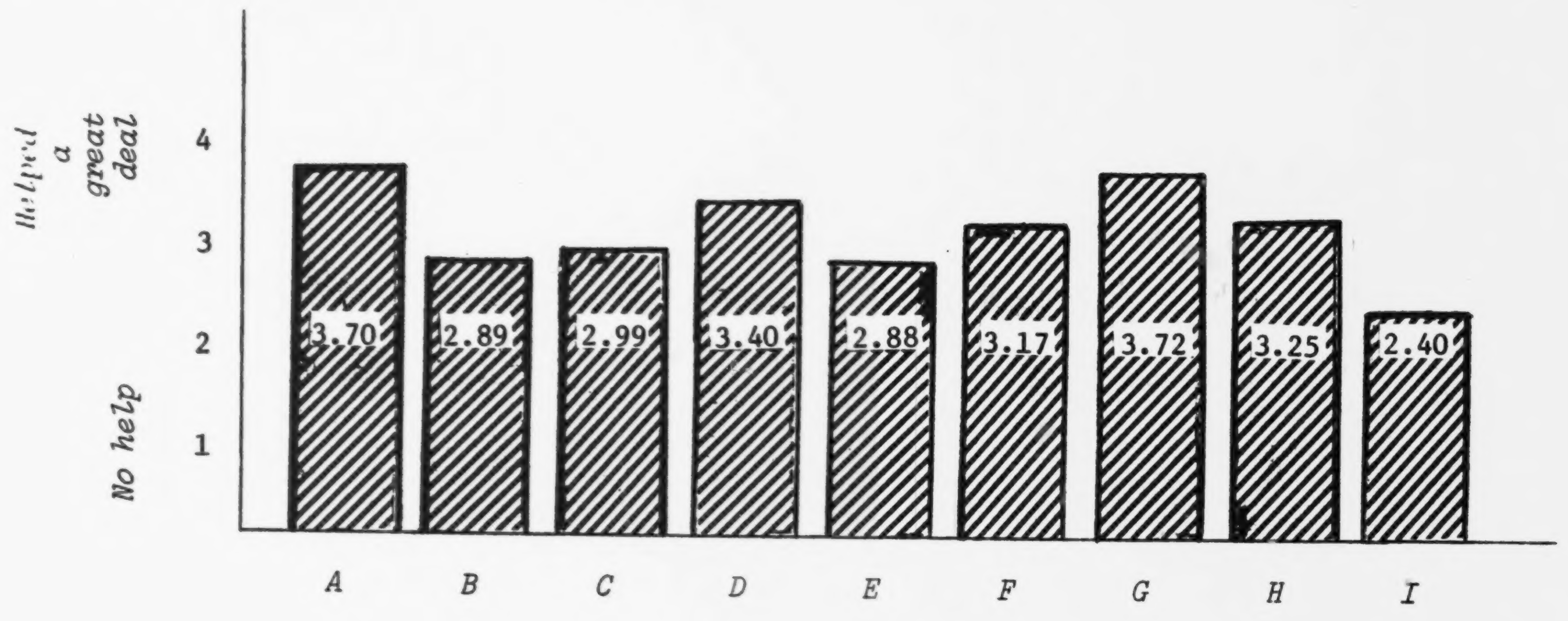

Figure 6. Median Ratings for Method Sessions.

KEY:
- *A, "Messing Around" Project (included: batteries and bulbs)*
- *B, Process of Observing (included: metric system)*
- *C, Process of Communication (included: graph construction and probability)*
- *D, Process of Inferring (included: hidden circuit)*
- *E, Preparing Instructional Objectives (included: AAAS Response Sheets)*
- *F, Process of Using Space-Time Relationships (included: Symmetry Activities)*
- *G, Process of Classifying (included: identifying "creature cards")*
- *H, Process of Measuring (included: clinometer and equal arm balance)*
- *I, Process of Predicting (included: graphing of rate of candle burning)*

Summary.

Part III of this evaluation speaks toward the quality of the efforts of the teacher-naturalists in providing leadership for an in-service teacher training workshop. As was pointed out in the preceding paragraphs, the teachers rated this workshop as a whole as being very helpful to them in their classroom performance. Most of the sessions were assigned ratings indicating that they were helpful to the teachers. This experience was seen by the participants to be of sufficient value that they recommended that all teachers in the District have the opportunity of attending this, or a similar, workshop.

PART IV

OUTDOOR NATURAL SCIENCE FIELD TRIPS CONDUCTED BY TEACHER-NATURALISTS

This part of the report is concerned with the Outdoor Natural Science field trips scheduled through the Project Office. As the project is designed, this activity is the primary one for which the teacher-naturalists are responsible. Through the medium of the field trips, the teacher-naturalists instruct students at all grade levels in Outdoor Education. This instruction includes affective considerations as well as cognitive skills. The other activities engaged in by the teacher-naturalists lend support to this.

The Special Projects Office, housing the Director of the Project, coordinates the field trips. When a teacher desires to go on a ONSL field trip, he sends his request to the building office. The request is sent on to the Special Projects Office where a date and time are arranged. Often the request from a building will be for all classes at a given grade level for the same trip. As was indicated in Parts I and II, there is a seasonal variation among the several types of trips. The teachers are informed of this in advance.

Frequency of Field Trips.

A direct measure of the impact on the District of this project is the frequency of contact that classes have with the instruction. This can be determined through analysis of the scheduled field trips. Of particular interest is this impact upon the various grade levels. The data summarizing this are presented in Table 2. It contains a breakdown of the various field trips according to grade level. The field trips offered at appropriate grade levels are described in Part I.

As can be noted from the Table, the Ruth Park site (ONSL) was visited by classes of nearly all grade levels. The most frequent user of this Laboratory was the third grade with 16 field trips. The Kindergarten-Primary unit as a whole accounted for 38 of the 45 visits to this site.

TABLE 2

Frequency of Field Trips by Grade Level Conducted by Teacher-Naturalists

Grade Level	Ruth Park	Busch Wildlife	Greensfelder Park	St. Louis County Sewage Treatment Plant	St. Louis Zoo	Missouri Botanical Garden	Taum Sauk Mountain	Coldwater Creek Water Plant	Audubon Screen Tours	Sixth Grade Camp	*Totals*
K	7										7
1	6										6
2	9					7					16
3	16	1									17
4	2				19		1				22
5											0
6		3		1				2		80	86
									9		9
Jr. High	1	6	3								10
Sr. High	4										4
Adult											
	45	10	3	1	19	7	1	2	9	80	177

The primary locus of instruction for the Kindergarten and primary one classes was the Ruth Park site. For Primary two classes the instructional sites were both Ruth Park and the Missouri Botanical Garden. At the Primary three level, again the locus was the Ruth Park Laboratory. The unit on Classification at the Fourth Grade level, which included a trip to the St. Louis Zoo, accounted for 19 of the 22 trips taken by classes at this level. As can be noted from Table 2, there were no field trips currently designed for the Fifth Grade. The greatest single impact of field trip instruction was at the Sixth Grade level with 80 trips incorporated into the Sixth Grade Camp program. This relative impact of field trips for each grade level is illustrated in Figure 7.

The impact at the sixth grade level is a result of the camping program. During the month of May all sixth grade classes spend a six-day period at the State Park which serves as the camp site. For the entire camping period, Mr. Kaltenthaler and Mr. Dwyer reside at the camp and serve as nature directors.

At the secondary level, the Busch Wildlife Area is the trip occurring most frequently, followed by Ruth Park and Greensfelder Park, respectively.

These data, when viewed on a proportional basis, indicate the *relative impact* at each grade level. These proportions are presented in Table 3. Since the primary concern of this Project thus far has been concentrated at the elementary level, these data are presented for this level only. It can be noted, for example, that .269 (or about one-quarter) of the 26 Kindergarten classes were involved in Outdoor Science field trip activities. Correspondingly, the proportions for the other grade levels are as follows:

Primary 1	.222
Primary 2	.615
Primary 3	.630
Grade 4	.846
Grade 5	.000
Grade 6	390.910

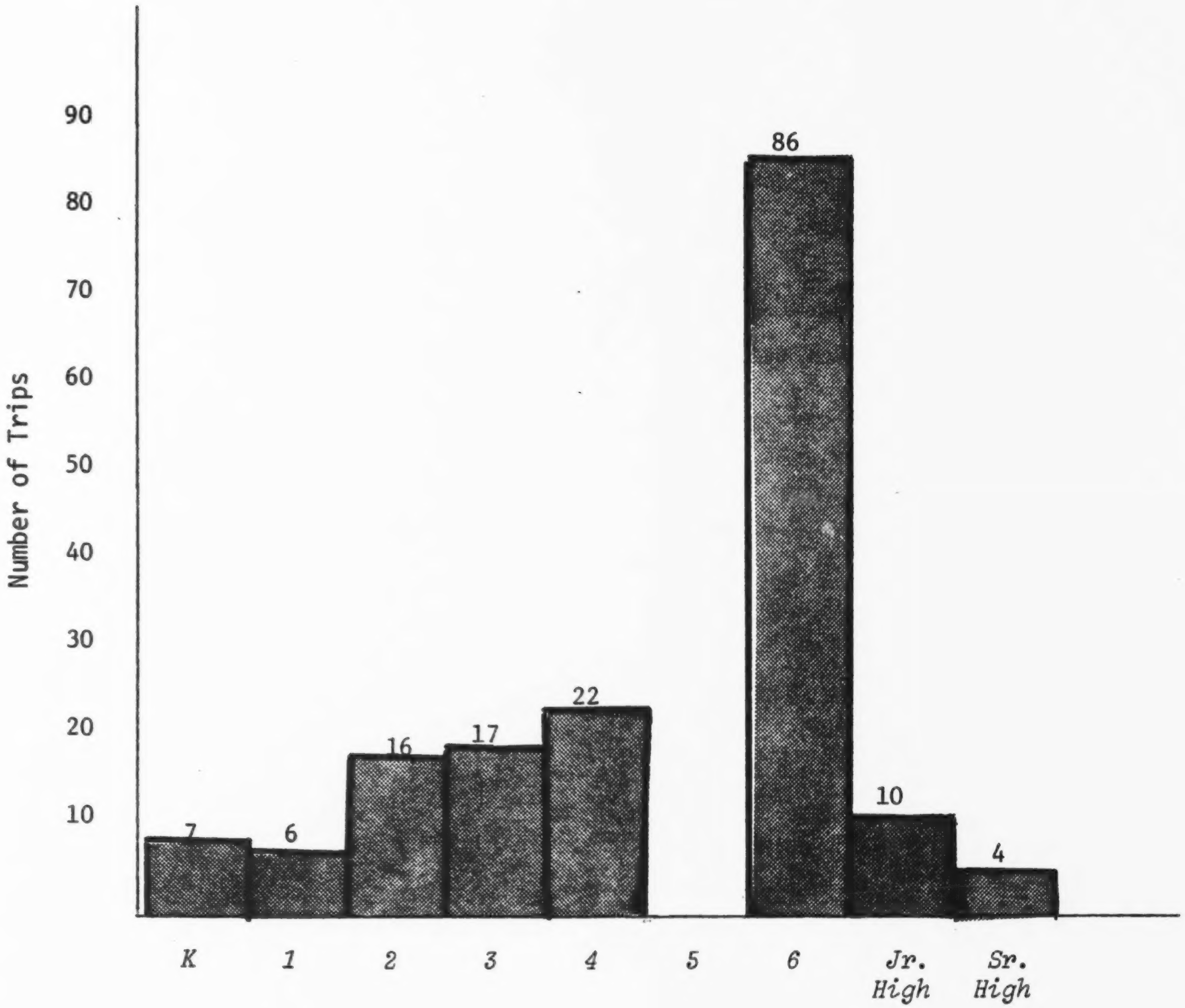

Figure 7. Density of Field Trips, By Grade Levels.

TABLE 3

Proportion of Field Trips per Class, per Grade Level

Grade Level	Ruth Park	Busch Wildlife	Greensfelder Park	St. Louis County Sewage Treatment Plant	St. Louis Zoo	Missouri Botanical Garden	Taum Sauk Mountain	Coldwater Creek Water Plant	Sixth Grade Camp	*Totals*
K	.269									.269
1	.222									.222
2	.346					.270				.615
3	.593	.037								.630
4	.077				.731		.038			.846
5										.000
6		.136		.045				.091	3.64	3.910
*Total**	.260	.026	.000	.007	.123	.045	.007	.013	.519	100.000
*Total***	.540	.054	.000	.013	.257	.095	.013	.027		100.000

**Including 6th Grade Camp Field Trips, total trips = 154*

***Excluding 6th Grade Camp Field Trips, total trips = 74*

Most readily observable from these data is the lack of impact upon Grade 5. It can also be noted that there is a relatively low impact upon Kindergarten and Primary 1. However, this trend becomes reversed at Primary 2 with a consistently increasing impact for grades 3, 4 and 6, with almost four trips for each sixth grade class. However, it should be noted that this latter level is the only one in which as many as one trip per class is taken.

Of further interest is the relative impact each field trip site contributes to the total field trip program. This can be determined by calculating the relative proportion of the total number of trips made to each site. Since the Sixth Grade Camping Program represents a special instance, these proportions are reported both with and without the inclusion of these trips. These data are presented in the two Total rows in Table 3. The first of these rows reflects the contribution of each site *including* Sixth Grade Camp; the second row reflects these contributions *excluding* Sixth Grade Camp.

Inasmuch as the development of the Ruth Park site is a central concern of this project, its contribution to the total field trip program should be noted. As can be seen from Table 3, it accounted for .260 (or about one-quarter) of the total field trips conducted by the teacher-naturalists. In this same respect, Sixth Grade Camp accounted for .519 (or about one-half) of this total. However, when excluding the Sixth Grade Camp from consideration, the Ruth Park site is then seen to contribute .540 (or over one-half) to the total.

These data indicate that the majority of contact with Outdoor Science Education occurs at the sixth grade level. Presently, less than half of such experiences occur during the preceding six grades. Within the program of local field trip experiences provided by the ONSL, the Ruth Park site assumes primacy.

Number of Students Affected.

Of importance to any multilevel program is the number of students it reaches. The breakdown of these data by field trip site and by grade level are presented in Table 4. It can be noted from this Table that a total of 171 Kindergarten students were reached by this program. This represents .279 of the Kindergarten population. In like manner, the totals and proportions for the other grade levels are:

Primary 1	150	.246
Primary 2	360	.570
Primary 3	391	.606
Grade 4	565	.810
Grade 5	000	.000
Grade 6	2,355	3.757
ELEMENTARY	4,028	.897
Junior High	498	.291
Senior High	100	.059
SECONDARY	598	.175

In assessing the impact in terms of number of students, the only highly concentrated impact occurs at the sixth grade level. A strong concentration is also found at Grade 4, with a somewhat lesser impact occurring at Grades 2 and 3. A minimum impact is found in Kindergarten and Primary 1, with about 25% of these children involved in the program. Again, the lack of program for Grade 5 is noted. Although the impact in the elementary school is relatively high, this is primarily the result of the "sixth grade effect" previously noted. The low-level impact is readily apparent for the secondary grades. Furthermore, approximately 21% of the elementary students and approximately 4.5% of the secondary students have contact with the Ruth Park site within this program.

TABLE 4

Number and Proportion of Students Having Contact With the Program, by Grade Levels

Grade Level	Ruth Park	Busch Wildlife	Greensfelder Park	St. Louis County Sewage Treatment Plant	St. Louis Zoo	Missouri Botanical Garden	Taum Sauk Mountain	Coldwater Creek Water Plant	Audubon Screen Tours	Sixth Grade Camp	*Totals*
K	171 .279										171 .279
1	150 .246										150 .246
2	196 .303					173 .267					360 .570
3	391 .606										391 .606
4	50 .072				485 .695		30 .043				565 .810
5											.000
6		215 .343		70 .112				70 .112		2000 .319	2355 3.757
Sub-Total	958 .215	215 .648		70 .016	485 .109	173 .039	30 .007	70 .016	162	2000 .448	4028 .897
Junior High	60 .635	278 .163	160 .094								498 .291
Senior High	100 .059										100 .059
Sub-Total	160 .047	278 .081	160 .047								598 .175
Adult											

Student Hours of Instruction.

Another important factor in consideration of the impact of this Program is the amount of instruction time devoted to ONSL field trips. Total instructional hours was determined by multiplying the number of students taking a given field trip times the duration of the trip. These products could then be added for all the field trips taken at a given grade level, or to a given site. By dividing the total hours of instructional time within a grade level by the number of students in that grade, the average proportion of student hours for that grade was determined. This could then be translated into the average number of minutes of instructional time per student at that grade level. The results of these calculations are presented in Tables 5 and 6. Table 5 contains the total student hours of instruction per grade level, by field trip site. Table 6 contains the average minutes per student of instructional time, by site and by grade level.

The total hours and average minutes per student are presented below for each grade level:

Kindergarten	222.50 hrs.	21.72 av. min.
Primary 1	200.00	19.68
Primary 2	812.50	75.24
Primary 3	901.50	83.82
Grade 4	1861.50	159.96
Grade 5	0.00	0.00
Grade 6	3905.00	373.68
ELEMENTARY	7903.00	106.44
Junior High	2558.00	89.82
Senior High	100.00	3.54
SECONDARY	2658.00	46.44

Before going further, it should be noted that these instructional times do not include in-class preparation time, of approximately one hour per trip per class, given by the teacher-naturalists. This would add approximately 2,900 hours of student instructional time to the totals presented in Table 5.

TABLE 5

Total Hours of Field Trip Instructional Time

Grade Level	Ruth Park	Busch Wildlife	Greensfelder Park	St. Louis County Sewage Treatment Plant	St. Louis Zoo	Missouri Botanical Garden	Taum Sauk Mountain	Coldwater Creek Water Plant	Audubon Screen Tours	Sixth Grade Camp	*Totals*
K	222.50										222.50
1	200.00										200.00
2	336.25					476.25					812.50
3	586.50	315.00									901.50
4	62.50				1439.00		360.00				1861.50
5											0
6		967.50	210.00					227.50		2500.00	3905.00
Junior	90.00	1668.00	800.00								2558.00
Senior	100.00										100.00
Adult											100.00
Elementary	1407.75	1282.50		210.00	1439.00	476.25	360.00	227.50		2500.00	7903.00
Secondary	190.00	1668.00	800.00								2658.00

TABLE 6

Average Minutes Per Student of Field Trip Instructional Time

Grade Level	Ruth Park	Busch Wildlife	Greensfelder Park	St. Louis County Sewage Treatment Plant	St. Louis Zoo	Missouri Botanical Garden	Taum Sauk Mountain	Coldwater Creek Water Plant	Audubon Screen Tours	Sixth Grade Camp	Totals
K	21.72										21.72
1	19.68										19.68
2	31.14					44.10					75.24
3	54.54	29.28									83.82
4	5.40				123.60		30.96				159.96
5											0
6		92.58		20.10				21.78			373.68
Junior	3.18	58.56	28.08								89.82
Senior	3.54										3.54
Adult											
Elementary	18.96	17.28		2.82	19.38	6.42	4.86	3.06		33.66	106.44
Secondary	3.36	29.28	13.80								46.44

It is interesting to note from Table 5 that, even when excluding the "sixth grade camp effect", the sixth grade students still receive more instructional time than all but two other levels (Grade 4 and the Junior High level). In terms of average minutes of instructional time per student, while excluding the "sixth grade camp effect", the instructional time for the sixth grade students is exceeded only by that of students in Grade 4.

Of the elementary grades, the least impact was seen in Primary 1, excluding Grade 5 where there was no instructional time. Even though the number of field trips conducted at the junior high level is relatively small, the total number of instructional hours for this group exceeds all but the sixth grade.

Furthermore, sites at which the largest number of student hours of instruction were recorded were (1) Sixth Grade Camp, (2) Busch Wildlife Area, (3) St. Louis Zoo, and (4) Ruth Park. This order is not surprising since the Ruth Park site is the only one of the four located in University City. The Sixth Grade Camp is a residency situation; both the Busch Wildlife Area and the Zoo trips are of such nature that they require considerable time to complete. The Ruth Park site, on the other hand, supports many relatively short trips, requiring virtually no travel time.

Summary.

The field trip is the primary vehicle of instruction for this program. Therefore, the impact of the program may be described, in part, by both the frequency of and instructional time given to field trips. The data which have been presented permit the following inferences to be made.

1. There is a noticeable "sixth grade effect" which contributes to the operation of this program. The effect stems primarily from the Sixth Grade Camping Program. Consequently, over 50% of the field trips are taken by this group which results in this group receiving more than twice the amount of instructional time per student than students at other levels.

2. Also present is the "fifth grade effect" which affects the program. This effect, representing a void in the activity, operates in a manner quite different from the "sixth grade effect". If the situation remains as it is, the sixth grade Outdoor Science experiences would seem to occupy an important place in the program. If it is deemed desirable to present a continuing succession of experiences throughout the grades, then it would seem that fifth grade experiences should be developed.

3. Within the frame work of the field trip program, the teacher-naturalists have had relatively little impact upon kindergarten and primary 1 classes. It is to be noted, however, that the instructional experiences for these grades call for utilization of the school grounds and the classroom teacher rather than field trips to another site.

4. The pattern of field trip experiences for primary 2 and 3 and grade 4 results in a relatively high impact at these levels, with an increasing amount of instructional time being given at each successive level.

5. Currently there are few field trip experiences designed for the junior high school level. The nature of the trips, however, requires that a large number of instructional hours to given to them. For this level, the program is largely supplemental in nature as an on-going Outdoor Education program already exists.

6. At the Senior High School level, the program has very little impact.

7. The development of the Ruth Park site into an Outdoor Natural Science Laboratory is central to the goals of the project. The relatively high impact of this site has been noted. Excluding those trips which comprise the Sixth Grade Camping Program, the ONSL becomes the most frequently visited site.

PART V

PROCESS-ANALYSIS OF AN OUTDOOR NATURAL SCIENCE FIELD TRIP

Purpose

The impact of the Project has been described thus far according to the distribution of the teacher-naturalists' activities and the frequency of instructional hours devoted to field trips. Any assessment of the program should include not only the quantity and distribution of activities, but some analysis of the process of instruction. This section, then, contains the descriptive analysis of one of the field trips to Ruth Park designed to explore *seed dispersal.* The particular trip analyzed was taken by a Primary 3 class during the Fall semester, 1968.

Procedure

The general method utilized in this study involved the close and careful observation of the flow of events and the interaction processes which took place during the course of the trip. This method involves non-participant observation as commonly utilized in sociology and anthropology, and more recently, education.*

Specifically, the method consisted of joining the field trip at its inception, and continuing with the class throughout the trip without taking part in the proceedings. Detailed notes were taken for later analysis. The observers were interested in all facets of the trip, including the relationship of the teacher-naturalists to the regular classroom teacher, the teacher-naturalists to the students, the teacher to the students, the specific content of the lesson, the sequence of activities, and the interaction of these elements.

The study is descriptive in the sense that the sequence of outward events transpiring on the trip will be reported and analytical in the sense that the subtle, affective meaning of these events in terms of the quality of interaction between the teacher and pupils will be described.

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*For this mode of analysis the writers are indebted to the work of Dr. Louis M. Smith and Mr. William Geoffrey in The Complexities of an Urban Classroom. Holt, Rinehart and Winston, Inc., Chicago, 1968.

The researchers attempted to look on the field trip situation as would an anthropologist studying another culture. This type of study is dependent upon the critical observations of the observer and is limited by those biases he brings to the situation.

The presentation will consist of a general narrative of the sequence of the events which took place during the trip. At selected points in the narrative, (1) qualitative interpretations of selected episodes will be inserted, (2) process analyses of selected interactional episodes will be included, (Figures 8-14) and (3) additional comments on the episodes will be made by one of the teacher-naturalists. By the inclusion of the latter, it will be possible for the reader to gain insight into the proceedings from the points of view of both the "outside" non-participant observers (the researchers) and that of the "inside" participant observer (the teacher-naturalists). These "inside" comments were gathered by means of showing the notes to the naturalist, pointing out the episodes which were to be analyzed, indicating the analytical meaning of the episode, and requesting him to comment from his point of view about the incident.

"Seed Dispersal" Field Trip, Primary 3

At the School

The observers arrived at the building to find the class of 24 students lined up in the hallway along with the teacher and two room mothers. Mr. Kaltenthaler joined the group shortly thereafter. The children waved, smiled, and some tugged at his sleeve for his recognition. *(The class has evidently had a positive interaction with him in previous contacts including the pre-trip presentation in the classroom.)* According to the usual practice in the primary grades, the class walked in pairs to the waiting bus. The children were talking easily with one another. The children entered the bus and were seated toward the back. The teacher, the mothers and the observers entered and sat to one side. Mr. Kaltenthaler entered and stood toward the center of the bus facing the class. In an easy, non-coercive manner, he initiated questions and elicited responses from the class. *(This seemed to communicate to the children the underlying message that "this is business; every moment counts; what I'm teaching is important, and we're not going to waste any time.")* The teacher sat quietly as a non-participant, allowing the teacher-naturalist to assume total management of the class.

On the Bus

On Way to Park

At a signal from Kaltenthaler, the bus driver started off. While the bus was in motion, he remained standing facing the class and gave a brief preview of the trip to come. *(A content analysis of his presentation shows that the words he used with the class make frequent reference to action with a satisfying outcome: accomplish, discover, investigate, etc. "Look and Watch" is stressed.)* He asked questions to which the responses provided a review of the class discussion which preceded the trip. His opening question was, "How do seeds get scattered?"

Most of the children were actively involved, listening, raising hands, and volunteering answers. Approximately three class members were engaged in non-relevant activity; looking out the windows, nudging one another, and the like. The teacher-naturalist did not call attention to this activity, reprimand the children, or seek to involve them. *(This represents a choice point for Mr. Kaltenthaler. He seems to operate under the general schema that it is better to let three or four of the class indulge in non-relevant behavior than to "break the mood" for the twenty who are very much involved.)*

The children's answers reviewed the various ways seeds can be scattered which had been discussed in the pre-trip sessions. Replies such as "wind", "animals", "hitchhikers" appear in our notes. One answer struck the class as humorous and elicited laughter and giggles. The teacher-naturalist's stance was acceptance of all remarks. *(The message which this mode of teacher behavior seemed to communicate was, "There is a place for well-timed humor.")* Those few children who were not paying attention, with one exception, began listening after the giggling started. It apparently struck them that they missed out on something humorous and enjoyable by their non-involvement. *(This offers support for the decision Mr. Kaltenthaler had made and by which he had abided.)* The entire class was now involved with the exception of one boy chewing a string from his jacket and gazing abstractedly out the window. As the bus neared the Ruth Park site, Mr. Kaltenthaler recapitulated the children's remarks and wove them

into a summary. *(A rough sort of closure was achieved, and it was apparent that this part of the proceedings was completed as the bus pulled into the entrance. In terms of technique, he used the children's own statements, not his own.)*

At the Entrance

As the bus pulled into the entrance and stopped, the manner of the class indicated interest, and pleasurable expectation. *(It seemed to the writers that this could be a direct result of the activity on the bus along the way. This was deemed significant in terms of the later efficient operation of the trip, for there were several dimensions of the situation on the bus which, upon analysis, required the teacher-naturalist to make a decision as to his mode of operation. The regular classroom teacher was present on the bus, but the requirement of the situation was that the teacher-naturalist take over the operation of the class. If there was a potential question of authority in the class' mind, it was resolved by the teacher-naturalist standing up, facing the class, and holding a review session while on the way. Undoubtedly, the teacher had prepared the class for this beforehand, but it would seem logical that if the teacher-naturalist had sat on the bus and had not interacted with the class as he did, the potential for confusion at the site would have existed. Time would have then been required at the site for the establishment of authority, and for organization.*

As it turned out, the preliminary activity on the bus by Mr. Kaltenthaler resulted in later efficiency. The class arrived at the site with no question as to whose direction to follow and was *ready for instruction. Their attention had been turned toward the subject at hand; they were "turned on" and ready at the time of their arrival. Figure 8 presents the two alternatives for the behavior faced by the teacher-naturalist and the consequences of each. Mr. Kaltenthaler took the alternative which resulted in the most preferable outcome for his purposes.)*

The bus stopped at the fork in the road where the nature trail separates to form an oval (see Figure 1). The teacher-naturalist, the children, teacher, parents, and observers disembarked. The group was met by Mr. Robert Dwyer, the other teacher-naturalist. The class was split into two groups of approximately equal size, one of which followed Mr. Kaltenthaler along the north trail and the other went with Mr. Dwyer. Both groups were to meet at the eastern edge of the path where it forms an oval.

One of the observers and the two room mothers followed Mr. Kaltenthaler. The other observer followed the group which included Mr. Dwyer and the teacher. Both observers took notes on their respective trips. Afterwards, they compared notes. The same general procedure and mode of instruction was used in both cases.

Therefore, the events and analyses to follow are presented for one of the groups, that which accompanied Mr. Dwyer.

Prior to Entering the Trail

The children stood in one spot facing Mr. Dwyer. One boy whispered to another. Attention was called for by the teacher-naturalist, but then he left to talk to the bus driver briefly. While he was gone, some of the children whispered and moved

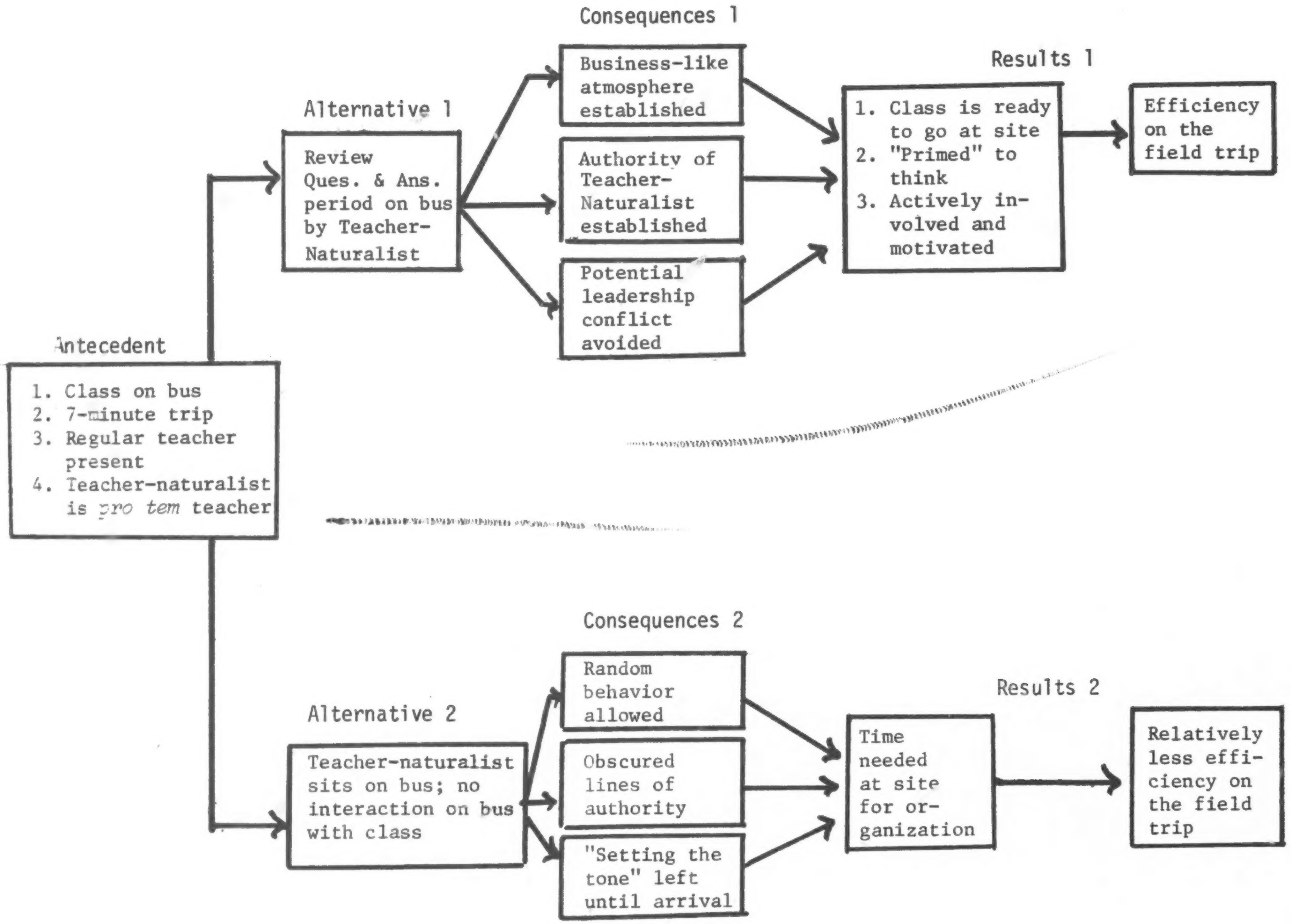

Antecedent
1. Class on bus
2. 7-minute trip
3. Regular teacher present
4. Teacher-naturalist is pro tem teacher
Alternative 1
Review Ques. & Ans. period on bus by Teacher-Naturalist
Consequences 1
Business-like atmosphere established
Authority of Teacher-Naturalist established
Potential leadership conflict avoided
Results 1
1. Class is ready to go at site
2. "Primed" to think
3. Actively involved and motivated
Efficiency on the field trip
Alternative 2
Teacher-naturalist sits on bus; no interaction on bus with class
Consequences 2
Random behavior allowed
Obscured lines of authority
"Setting the tone" left until arrival
Results 2
Time needed at site for organization
Relatively less efficiency on the field trip

Figure 8: A Model of Two Alternatives Open to the Teacher-Naturalist and Their Consequences.

around slightly; one boy picked up a stick. *(The children seem to be getting acclimated to the surroundings. They seem sociable and relaxed.)* **Mr. Dwyer returned and asked, "Why are you here?" This elicits the response from a girl, "To find out how seeds get scattered." Mr. Dwyer went on to say that with each person using his eyes, they would have 22 eyes instead of one pair at work.** *(This preliminary exchange seems to set the tone for the management of the trip. Mr. Dwyer's behavior establishes his leadership. His acceptance of the girl's answer rewards her for answering. His comments about 22 eyes implies that the total group is needed to help accomplish the goal. It is striking that the whole "tone" from entering the bus to the present has been one of purposeful activity.)*

(Figure 9 begins a series of Process-Analysis charts graphically presenting some of the interaction episodes between the teacher-naturalist and the class. These figures essentially describe the overt actions of the instructor and the students and relate these actions to the internal, affective areas of the actors and the group as a whole. The horizontal axis indicates the time dimension within which the behavior occurs. The vertical axis is divided into three main sections: Mr. Dwyer, Individual students, and the Group as a whole. The overt behavior during the episode of each of these units is described. Above Mr. Dwyer's behavior, the observers have inserted a dimension labeled "schema". Entries here are motivations ascribed to the instructor.

Below the "behavior" dimension of the individual student appears a dimension labeled, "sentiment". The rationale for this

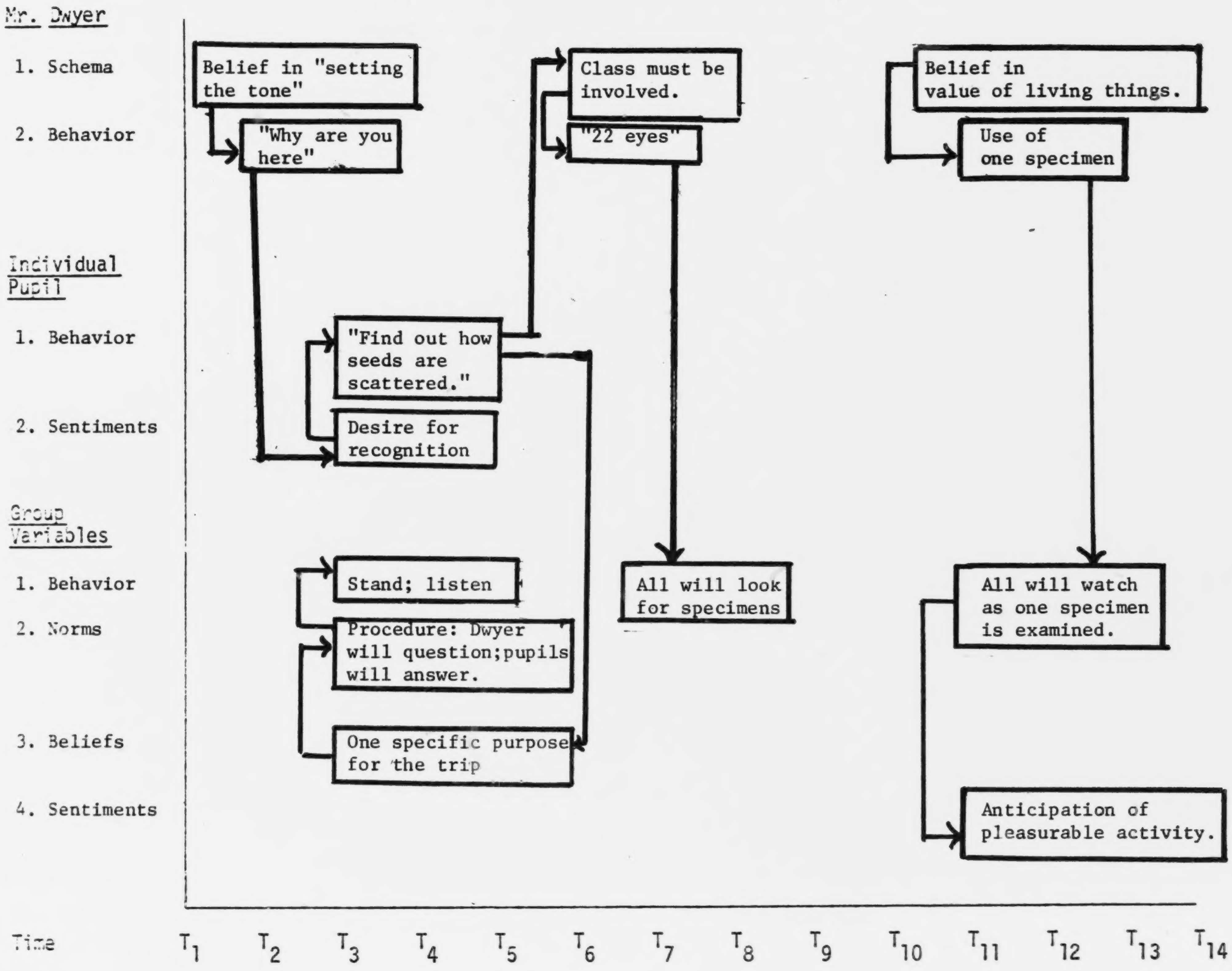

Mr. Dwyer
1. Schema
2. Behavior
Individual Pupil
1. Behavior
2. Sentiments
Group Variables
1. Behavior
2. Norms
3. Beliefs
4. Sentiments
Time
Belief in "setting the tone"
"Why are you here"
"Find out how seeds are scattered."
Desire for recognition
Stand; listen
Procedure: Dwyer will question;pupils will answer.
One specific purpose for the trip
Class must be involved.
"22 eyes"
All will look for specimens
Belief in value of living things.
Use of one specimen
All will watch as one specimen is examined.
Anticipation of pleasurable activity.
T_1
T_2
T_3
T_4
T_5
T_6
T_7
T_8
T_9
T_{10}
T_{11}
T_{12}
T_{13}
T_{14}

Figure 9. A Process Analysis of Mr. Dwyer "Setting the Tone" For Instruction.

is that the behavior of the child was motivated by a sentiment, and that the behavior of the instructor has an impact upon the sentiment, or feelings of the child. Entries in this place refer to sentiments the observer ascribed to the student on the bases described below.

The behavior of the group is the first group variable listed. The variables listed below the group's behavior are the sentiments, or affective feelings ascribed to the group, the beliefs, built up within the group and resulting from their sentiments, and norms, or the patterns of behavior the group established resulting from their belief system.

In the schema of the observers, the interaction between the teacher-naturalist and either the entire group, or individuals from the group, leads to the formation of group sentiments, beliefs, and norms which influence the behavior of the group. These individual and group variables were, of course, not stated explicitly. Rather, they were ascribed to the actors taking part in the episodes by the observer on the basis of actions, expressions and tone of voice, and other cues.)

A clump of flowers at the edge of the road was being considered. A child asked, "Poison ivy?" and was told by Mr. Dwyer, "We'll get to that later." *(This abrupt rebuff could have had the effect of creating a feeling of dissonance in at least this one youngster and, perhaps others. Later on, Mr. Dwyer did go back to the topic of poison ivy and did refer to the boy who had raised the issue. It is assumed that Mr. Dwyer, in his own personal schema for conducting a field trip, believes in taking up* *topics in order. His discussion of poison ivy at a later time probably resolved the feeling of dissonance felt by the group and reinforced within the belief system of the total group the idea that Mr. Dwyer would answer all reasonable questions. The end result in terms of the affective feelings of the group would be a general feeling of satisfaction.)* Figure 10 presents this interaction episode schematically.

After the field trip had been concluded, Mr. Dwyer was asked to comment on the incident. His reason for not answering the boy's query at the moment it was asked appears below:

> "I had begun on a concept I wanted developed. The question of poison ivy is a secondary concept that's always included in a trip. Since I knew I'd get to it eventually, I wanted to follow through on that initial concept. Poison ivy is important, but I didn't want to break the continuity at that point."

Between the time the boy asked about poison ivy and the time Mr. Dwyer did discuss the topic, the question, "What do we get from flowers?" from the teacher-naturalist led into an interesting interactional episode which had implications for the management aspect of the class. The answer to the query was, "Seeds."

Mr. Dwyer then said, "O.K. Let's take a look at a worn out flower." He then showed the group how to tell when a flower is worn out. *(At this very early stage of the game he seems to be very subtly getting across the idea of respect for living plants in a very natural manner. He does not preach, or for that matter,*

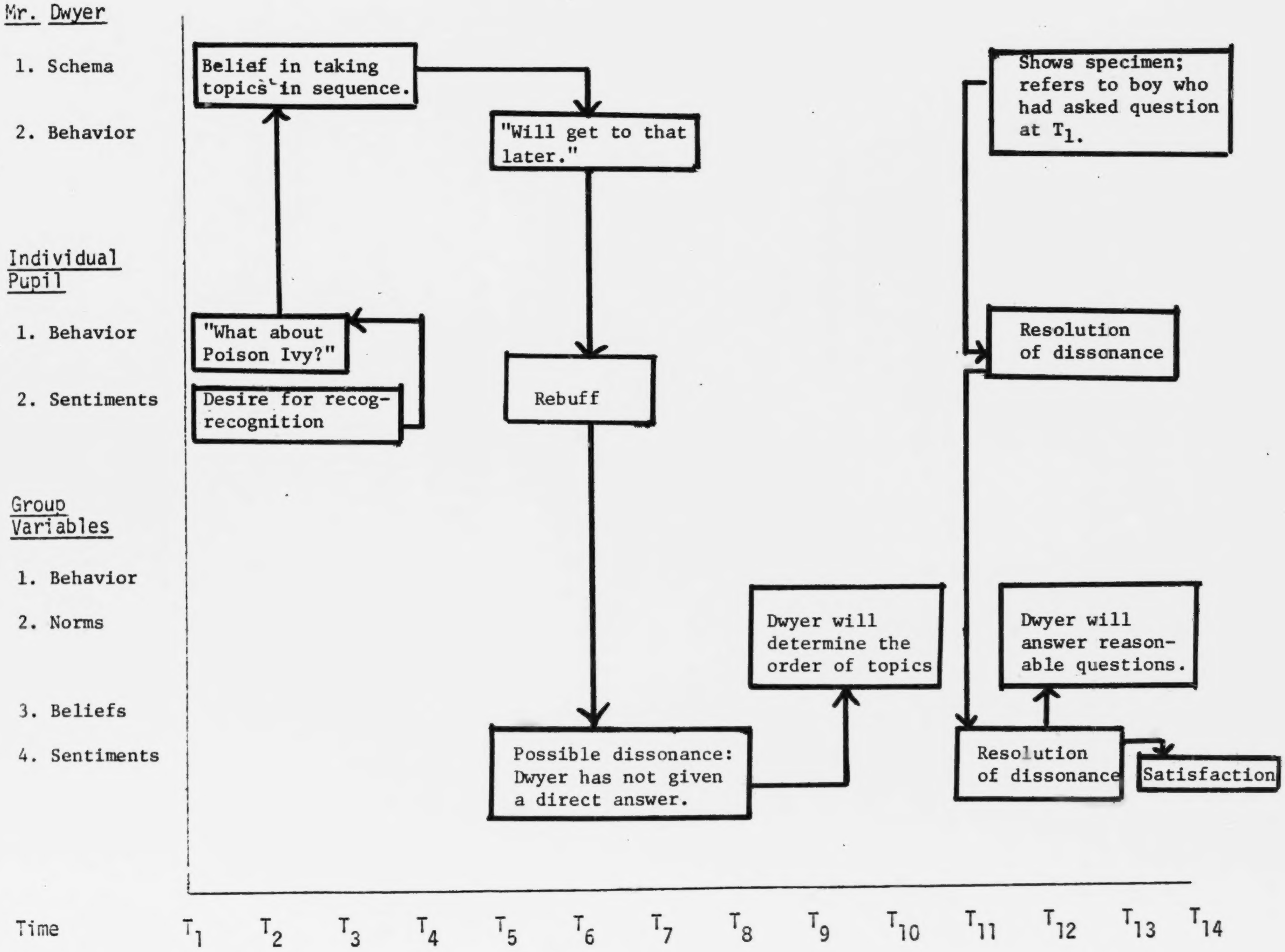

Mr. Dwyer
1. Schema
2. Behavior
Individual Pupil
1. Behavior
2. Sentiments
Group Variables
1. Behavior
2. Norms
3. Beliefs
4. Sentiments
Time
Belief in taking topics in sequence.
"Will get to that later."
"What about Poison Ivy?"
Desire for recog-recognition
Rebuff
Possible dissonance: Dwyer has not given a direct answer.
Dwyer will determine the order of topics
Shows specimen; refers to boy who had asked question at T1.
Resolution of dissonance
Dwyer will answer reasonable questions.
Resolution of dissonance
Satisfaction
T1
T2
T3
T4
T5
T6
T7
T8
T9
T10
T11
T12
T13
T14

Figure 10: A Process Analysis of Mr. Dwyer Resolving Dissonance.

even directly mention the subject. He seems to be establishing with the group the procedure that all of the group will look at one specimen.) To the observer, it seemed at this point that the class expressed polite interest but no observable excitement. After plucking a single flower, his statement, "I need someone's hand for an operating table to take this flower apart." noticeably increased the level of excitement. Frantic handwaving, jumping, pushing forward, and requests to be chosen were the behaviors exhibited by the children. *(This appeal for an individual's help from the instructor roused the enthusiasm of the group.)* One boy was chosen. Mr. Dwyer opened the flower on the boy's open hand and asked for an identification of the kind of seeds. The class identified them as "parachutes". *(The teacher-naturalist does not name the plants and the class does not ask its name. The concepts are the important item, where in the flower the seeds are produced and how the seeds travel see Figure 11).*

While this was ensuing, the observer noted one boy engaged in non-task oriented behavior. He attempted to involve other boys as well. He ruffled the hair of two boys near him, nudged a third to watch him as he pretended to eat some flowers, and made noises with his lips. Mr. Dwyer noticed him, but ignored his actions. The rest of the class was involved in his presentation, and the contagion did not spread. After the trip, Mr. Dwyer was asked to comment on this aspect of his classroom control. He replied:

> "First of all, I believe there can be freedom for kids within a set of predetermined limits; these are mostly

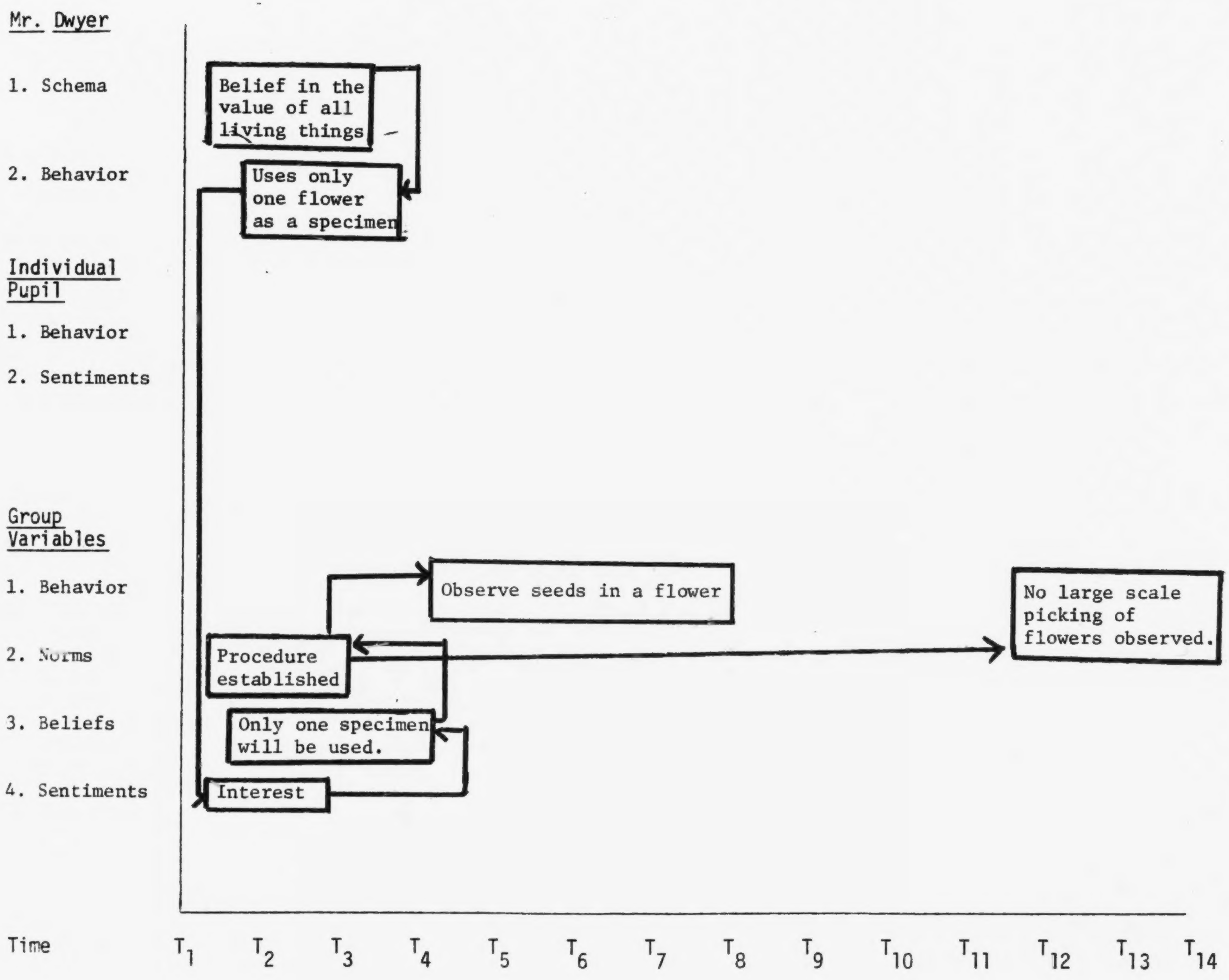

Mr. Dwyer
1. Schema
2. Behavior
Individual Pupil
1. Behavior
2. Sentiments
Group Variables
1. Behavior
2. Norms
3. Beliefs
4. Sentiments
Time
Belief in the value of all living things
Uses only one flower as a specimen
Observe seeds in a flower
No large scale picking of flowers observed.
Procedure established
Only one specimen will be used.
Interest
T_1
T_2
T_3
T_4
T_5
T_6
T_7
T_8
T_9
T_{10}
T_{11}
T_{12}
T_{13}
T_{14}

Figure 11: A Process Analysis of Mr. Dwyer Arousing Norms For Examining Specimens.

> established by whether he was disturbing the entire group or the possibility of injury - safety if you will. Also, probably by the duration; if the kid was going to continue to horse around for a long period and not get anything out of the trip, I'd have to stop him.
>
> "If he had continued to horse around, my first choice would have been to single him out non-verbally with a look or a light touch. My second technique would have been to involve him in the lesson (use his hand for a table or something). Third, if neither of these had worked, I'd have to reprimand him verbally and ask for his attention.
>
> "As a last resort, I'd put him on the bus, exclude him from the activities of the group. I've only had to do this twice in the last three years."

Mr. Dwyer had the seeds from the open flower on the 'operating table' before him. "How many seeds?" he asked, and the children and the naturalists counted together. They arrived at 25. The class was then directed to count the number of flowers on the plant from which he had picked the specimen. All arrived at 14 flowers on the plant. Mr. Dwyer's next question was, "How many seeds are produced by this one plant?" He let the class try to multiply mentally. Finally he suggested they use what he termed 'nature's chalkboard'. He proceeded to multiply 14 x 25 on the ground, scratching the numerals with a pointed stick. The entire class was involved in working the problem through with him. *(The observer's penciled notes for this interlude read, "Beautiful!" With subtlety and with no preaching or direct statements he is* *sending out the message that math is the language of science. The class may not get this message immediately, or even in the near future, but it has been placed by this bit of interaction.)* "How many plants in the group?" asked Mr. Dwyer. The entire class counted and arrived at 15. This was entered on 'nature's chalkboard', and the class made the calculations 25 x 14 = 350 x 15 = 5250. "Would there be room in this field if every one of those seeds bloomed into another plant?" the teacher-naturalist asked. The class responded with,"No," from many of the children.

Mr. Dwyer then took up the topic of poison ivy with, "Before we go walking along the trail, we had better learn to identify poison ivy." He finds a growth and shows its characteristics to the class. At this point he specifically referred to the boy whom he had cut short earlier. Figure 10 indicates the probable outcome in terms of resolving dissonance. The class received instructions, "When you find a specimen, call to us and we'll all come to examine it." *(At this point he is specific about not picking the flowers from the plants.)* The group started off along the trail, spreading out and looking for specimens.

On the Trail

The class walked to and fro along the path looking for seed-bearing plants. They were in groups of their own choosing, and no child seemed to be an isolate. Most of the activity seemed relevant to the task; at times, one or another group engaged in brief interludes of horseplay, then got back to business. As the groups, or teams, found a specimen, they called out, and the rest of the group came over and looked. Mr. Dwyer invariably selected a worn-out flower to pick or, at any rate, let the class know that only one or two flowers were to be picked. He then opened the plant, each time using the hand of a different volunteer as an 'operating table'. He never gave the name of any plant. He led the class to speculate on the manner of dispersal of the seeds from the shape of the seed or the flower. In all cases, he compared the shape of the seed or flower to a common, everyday object. "salt shaker', 'grocery bag', devil's horns', 'parachute' and 'propellor' were some of the comparisons used. *(This mode of instruction provided the class with memory cues which, undoubtedly, would facilitate recall. The children made some logical deductions during these sessions which caused the observer to write, "Beautiful reasoning from these kids" in his notebook.)*

When the group was about a quarter way along the path, one boy deliberately stepped on an insect and repeatedly crushed it. Mr. Dwyer came up and said, "That spider lives here! This is his home! Would you like someone to come to your house and step on you?" The actions, posture, and facial expressions of the boy thus singled out were interpreted by the observer as reflecting embarrassment at first, then a smiling relief from embarrassment as Mr. Dwyer concluded with the question, "Would you like someone to come to your house and step on you?" *(In analyzing this episode, the observers believe that the instructor's behavior stemmed from his seeing an opportunity to teach a lesson and reinforce in a stronger, more direct manner his own belief in the value of all living things, and extend his admonition against needlessly picking flowers to include needlessly stepping on insects.*

By turning his admonishment into a mild joke at the end, it is assumed that this had the twin effect of relieving the boy from embarrassment and arousing pleasurable feelings in the total group about Mr. Dwyer. On the level of the group's beliefs and norms, it probably reinforced those introduced previously regarding procedures. The observer noted no further stepping on bugs or pulling of flowers for the rest of the trip.)

This episode is presented schematically in Figure 12. Mr. Dwyer was asked to comment upon this episode after the trip had ended:

> "The observer's hypothesis of my belief and value system including the value of all living things sums it up accurately. Whether a desire for attention or a moment of meanness or a built-in reaction caused the boy to step on the spider, I think I would have stopped him at that point because it was a teachable moment.
>
> "I think it's very important that children understand that, while they don't want spiders in their house or snakes in their backyard, these things are a part of the natural environment."

Further along the trail, the group came upon a group of seedlings. Mr. Dwyer asked, "Where did these trees come from?"

"Other trees," and "Seeds from other trees," responded most of the class.

The teacher-naturalist pointed to a grove of fully-grown trees located approximately 500 yards behind the seedlings.

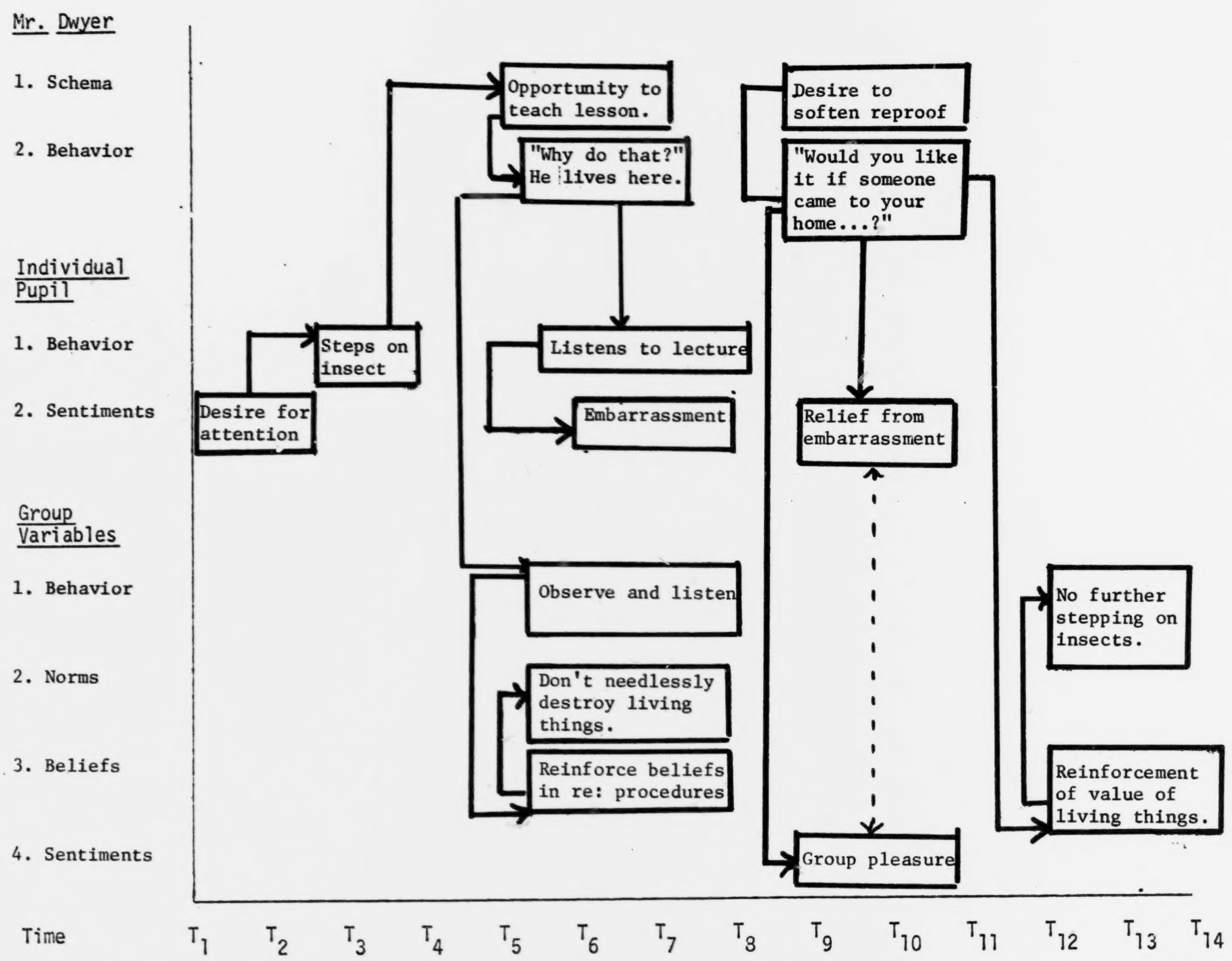

Mr. Dwyer
1. Schema
2. Behavior
Individual Pupil
1. Behavior
2. Sentiments
Group Variables
1. Behavior
2. Norms
3. Beliefs
4. Sentiments
Time
T_1
T_2
T_3
T_4
T_5
T_6
T_7
T_8
T_9
T_{10}
T_{11}
T_{12}
T_{13}
T_{14}
Desire for attention
Steps on insect
Opportunity to teach lesson.
"Why do that?" He lives here.
Listens to lecture
Embarrassment
Observe and listen
Don't needlessly destroy living things.
Reinforce beliefs in re: procedures
Desire to soften reproof
"Would you like it if someone came to your home...?"
Relief from embarrassment
Group pleasure
No further stepping on insects.
Reinforcement of value of living things.

Figure 12: A Process Analysis of Mr. Dwyer Reinforcing the Procedural Norms.

"These partially-grown trees came from those trees. How do you think the seeds were dispersed?"

The class chorused, "Wind," and "From the wind blowing them."

Mr. Dwyer went on, "How can you check?"

Members of the class found seeds on the ground. "Propellors!"

"O.K., then," replied Mr. Dwyer, "how sure are you that the seeds for these trees were carried by the wind?" The replies from the class indicated that they were very sure.

(This episode presented a fine example of empirical verification on the part of primary grade children. The teacher-naturalist, in the course of his instruction, never tells the class an answer outright. They must form a hypothesis and verify by observation. This episode and others like it also have implications for the arousal of a belief system among the children concerning the manner of procedure: "We have to make a guess and then check to see if we're correct." Figure 13 presents this episode.)

Mr. Dwyer stopped the group at a point along the path where there was a tangle of plant growth. He looked over the group, saying, "I'm looking for a volunteer to go on a dangerous mission." *(The use of vivid words to involve the class actively has already been noted with the 'operating table' and 'nature's chalkboard' examples.)*

The group waved their arms frantically as all the children volunteered. The teacher-naturalist selected a boy who was wearing a dark blue navy pea coat. "Walk into that area of trees and touch that tree (he pointed to one in the midst of the tangle of growth), then come back," he instructed. The entire group appeared

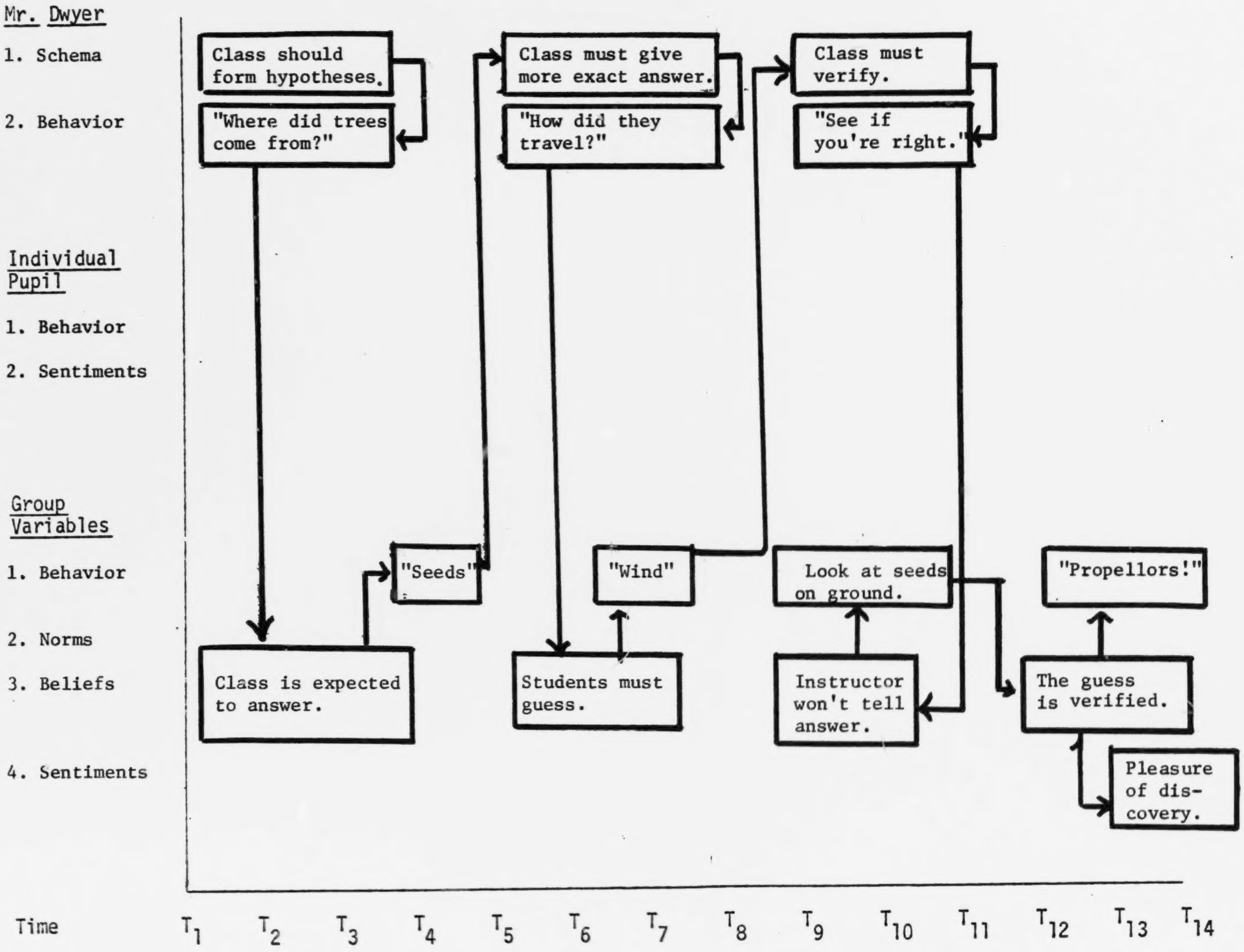

Mr. Dwyer
1. Schema
2. Behavior
Individual Pupil
1. Behavior
2. Sentiments
Group Variables
1. Behavior
2. Norms
3. Beliefs
4. Sentiments
Time
Class should form hypotheses.
"Where did trees come from?"
Class is expected to answer.
"Seeds"
Class must give more exact answer.
"How did they travel?"
Students must guess.
"Wind"
Class must verify.
"See if you're right."
Look at seeds on ground.
Instructor won't tell answer.
The guess is verified.
"Propellors!"
Pleasure of dis-covery.
T1
T2
T3
T4
T5
T6
T7
T8
T9
T10
T11
T12
T13
T14

Figure 13: Process Analysis of Pupil Roles as Hypothesis Verifiers.

attentive and involved, watching to see what would happen. Some of the children nudged one another and exchanged knowing smiles.

When the boy returned, his blue jacket was covered by thistles. Mr. Dwyer turned the boy around so the group could see the back of his coat and asked, "How does the plant in there disperse its seeds?"

"Hitchhikers!"

Bringing the class in for a close up inspection of the thistles, Mr. Dwyer gave them a memory cue by saying, "These seeds look like devil's horns." Two boys started to go into the thicket to repeat the process, but were called back. "We already have enough seeds for our purpose," stated Mr. Dwyer "Don't use up extra seeds." *(This bit of interaction gave the teacher-naturalist another opportunity to reinforce his previous statements. It also should have, on the level of the group sentiments, raised some feelings among the group that Mr. Dwyer is very consistent in his behavior and really believes what he says.)* Figure 14 presents this interactional episode. Mr. Dwyer's comments about his method of teaching this group appear below:

> "I'm thoroughly convinced that student involvement is the way to teach. Just telling the kids things is very ineffectual in that they forget so much when they're just told something. If they see a 'propellor' functioning, or a 'parachute', this is what the trip is all about.
>
> "Being able to name the plant is relatively unimportant at this stage. Perhaps at the fifth grade level I would be

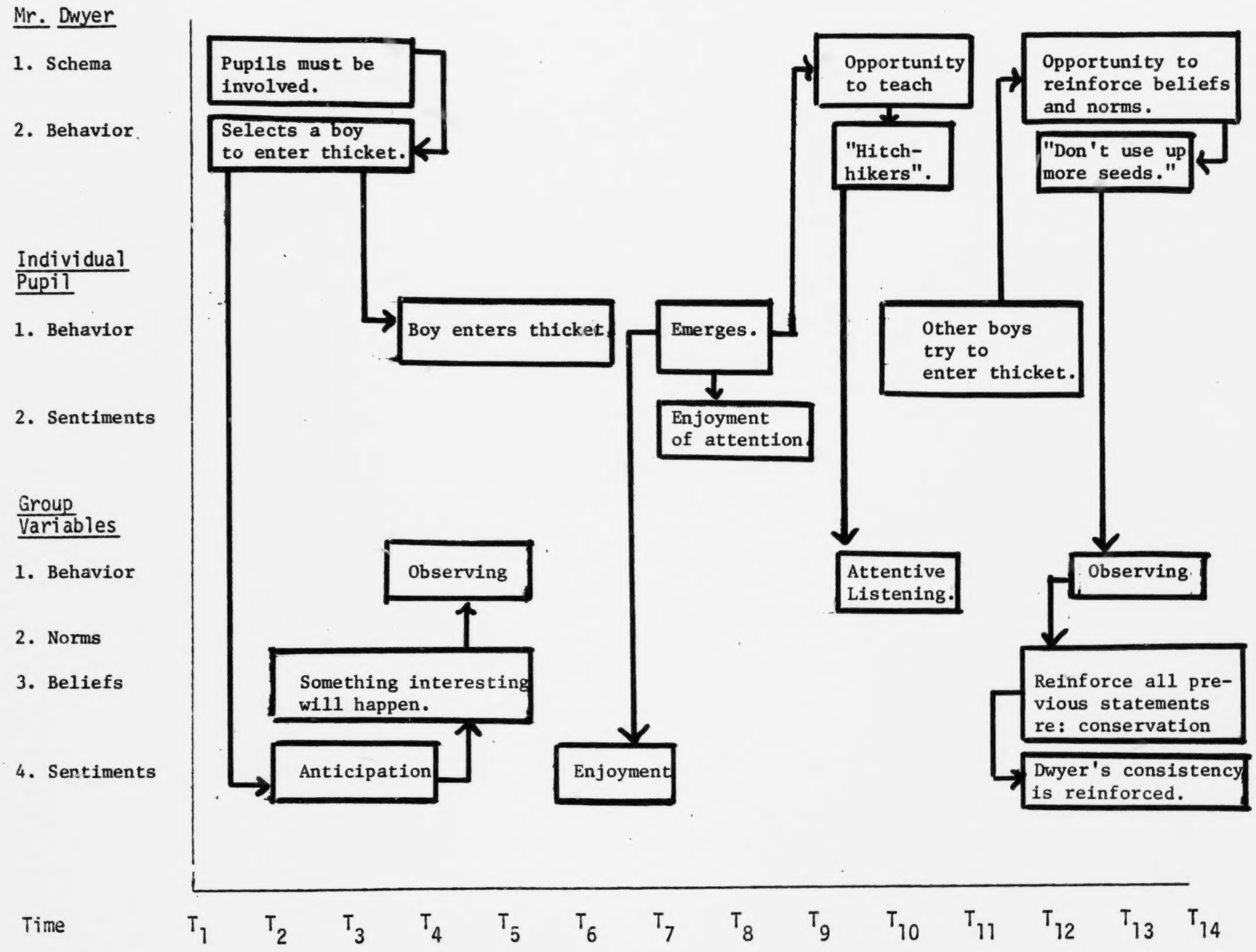

Mr. Dwyer
1. Schema
2. Behavior
Individual Pupil
1. Behavior
2. Sentiments
Group Variables
1. Behavior
2. Norms
3. Beliefs
4. Sentiments
Time
Pupils must be involved.
Selects a boy to enter thicket.
Boy enters thicket.
Anticipation
Something interesting will happen.
Observing
Enjoyment
Emerges.
Enjoyment of attention.
Opportunity to teach
"Hitch-hikers".
Attentive Listening.
Other boys try to enter thicket.
Opportunity to reinforce beliefs and norms.
"Don't use up more seeds."
Observing
Reinforce all previous statements re: conservation
Dwyer's consistency is reinforced.
T_1
T_2
T_3
T_4
T_5
T_6
T_7
T_8
T_9
T_{10}
T_{11}
T_{12}
T_{13}
T_{14}

Figure 14: A Process Analysis of Pupil Involvement and Maintenance of Belief Systems.

more inclined to name the plants for the class if the name itself would have a function. For example, in an upper grade field trip to make a plant census, using names is the simplest way to record the specimens present."

The Conclusion of the Trip

At the end of the path, the group met the rest of the class which had been led by Mr. Kaltenthaler. As the class climbed back on the bus which had come down to meet them, there was the expected jostling and rearrangement of seats.

"Move to the rear of the bus, please," said Mr. Kaltenthaler as he came aboard and took his position facing the class. As the bus started off, he asked review questions of the class. "What was the most interesting method of seed dispersal you saw?" he began. The review continued throughout the return trip. As the bus pulled up in front of the school, the group was left with a question to discuss in class: "Why doesn't each seed produced by each plant grow?" *(The implication of posing a discussion question for the class is probably to get across the message that the learning experience is not over yet.)*

The children returned to the building walking in pairs. The teacher and the room mothers thanked the teacher-naturalists. The observers ascertained from the naturalists that this trip was a typical one.

Comments

The purpose of this section of the report was to investigate the nature of the instruction given during a field trip and to note and analyze the social relationships, or the emotional climate if one prefers, which prevail therein.

The type of instruction, it was noted, required that the children become actively involved in the *process* of forming hypotheses and verifying them from the evidence they could find in the field. The response of the class to this mode of instruction was described.

In terms of the ongoing social relationships within the class, the entrance of the teacher-naturalists in the structure for a brief time allows the teacher the opportunity to interact with the students in a different manner from that of the classroom setting. Furthermore, each child's chance for interaction with the instructor and the other members of the class increases. They may move from group to group in a manner that might not be possible in the confines of a classroom.

Summary

The trip, from inception to conclusion, was marked by a brisk, efficient atmosphere. The total time, including traveling time on the bus, was used to further the purposes of the trip. Although the students were primary grade children, the stance of the teacher-naturalists was professional, not condescending. The basic activity required of the pupils on this trip was that they examine various plants in order to determine the manner in which the seeds from the plant are dispersed. They had been provided with a schema for categorizing the various methods during the in-class preparation period. As was stated in the description of this type of trip, "Naming the plants or seeds is not considered important and full attention is devoted to theorizing as to how the seeds are spread," (p. 5).

The field trip has been described from the aspects of the flow of activities, the process of instruction, maintenance of control, the network of relations surrounding the teacher-naturalists, the class, and the classroom teacher. Selected episodes of interaction between one of the teacher-naturalists and the instructional group were analyzed in order to point up the social and instructional processes which prevailed during the episode.

PART VI

FIELD TRIP OPINION SURVEY

Purpose

The operation of this project is of such nature that it depends upon teacher self-selection into the field trip activities making up the instructional portion of the program. Logically, therefore, the teachers' attitudes toward the utilization and management of the ONSL field trips would be a critical determinant of the effectiveness of the entire project.

An appropriate method of gathering such information is a teacher opinionnaire. However, the scores on such an instrument would be of dubious value for evaluating the project if relevant criteria measures were not obtained for comparative purposes. Consequently, opinion measures were also obtained on the *general utility* of field trip experiences, the *general management* of field trips, and *affective* concerns associated with field trips. Comparisons among the scores on these scales would yield useful evaluative information concerning the relative predisposition on the part of the teachers toward this project.

It was also deemed important to investigate other selected teacher variables as they related to teachers' opinions about the Outdoor Science field trips and their actual utilization of the available field trips. Therefore, the opinionnaire was designed to collect information on each of the following variables:

1. the age of the teacher.
2. the sex of the teacher.
3. the grade level taught.
4. number of years taught, inclusive.
5. number of years taught in the district, inclusive
6. highest degree attained.
7. number of semester hours in the Language Arts, Humanities, and Math-Science.

8. general utility of educational field trips.
9. general management of educational field trips.
10. affective concerns associated with educational field trips.
11. management and utility of Outdoor Natural Science Project field trips.
12. rank of science among eleven curricular areas taught in the schools.
13. number and sites of field trips taken during the 1968-69 school year.
14. number and sites of Outdoor Natural Science field trips taken during the 1968-69 school year.

Field Trip Opinion Scale

The Field Trip Opinion Scale was constructed by the researchers (see Appendix A). It contained 56 opinion items divided into four scales as follows: 1, General Utility of Field Trips (UT), consisting of 12 items; 2, General Management of Field Trips (MT) consisting of 12 items; 3, Affective Concerns Associated with Field Trips (AF) consisting of 13 items; and 4, Management and Utility of Outdoor Natural Science Field Trips (NS) consisting of 13 items. In order to make the purpose of evaluating the ONSL program of trips less obvious to the respondents, six extraneous items were included. Before items were included in the scale, they were submitted for examination to six independent judges. These judges were instructed to examine the items for their clarity and to sort them into the indicated categories. Items were included only after consistent agreement among judges as to their clarity and category classification.

The format of the opinionnaire consisted of a cover page with directions for responding and three double column pages of items. The items were arranged in a sequential manner with one item from each scale appearing in turn. This enabled the construction of a separate answer sheet on which the items in a given scale were located in the same response column (see Appendix A).

The item statements were responded to on the following four-point scale:

If you *STRONGLY AGREE* with the statement,
blacken the space marked "A"

If you *AGREE* with the statement,
blacken the space marked "B"

If you *DISAGREE* with the statement,
blacken the space marked "C"

If you *STRONGLY DISAGREE* with the statement,
blacken the space marked "D"

Scoring of the opinnionnaire was done using the following procedure:

1. If the item response indicated an extreme positive opinion (A or D depending on whether it was a positively or negatively stated item) it was assigned an item value of +2.

2. If the item response indicated a generally positive opinion (B or C depending on the statement) it was assigned an item value of +1.

3. If the item response indicated a generally negative opinion (B or C depending on the statement) it was assigned an item value of -1.

4. If the item response indicated an extreme negative opinion (A or D depending on the statement) it was assigned an item value of -2.

5. An individual's score for a scale was determined by summing the item values comprising that scale. The possible ranges of scores for the four scales were: UT, -24 to +24; MT, -24 to +24; AF, -26 to +26; NS, -26 to +26.

6. By adding and dividing by the appropriate constants, the scale-scores were converted to percent scores where 0.00 represented an extreme negative opinion, 50.00 represented an ambivalent or mixed (neither positive or negative) opinion, and 100.00 represented an extreme positive opinion. These scores were recorded for analysis since they converted the scaled-scores to a common percent scale for all four scales.

7. General management and utility of field trip score (MUT) was determined by averaging the MT and UT scale scores and converting the composite to a percent score.

Procedure

The opinionnaire was administered to only the elementary teachers in the district since the first seven grades (including Kindergarten) comprise the major focus of the project. It was administered in each school by the building principal. The principals were requested to administer it during regular faculty meetings, and then to return all materials to the researchers. This procedure was followed by many of the principals. However, several of them handed out the materials to the teachers requesting them to complete the opinionnaire and return it to the office. Consequently, in three schools a small number of responses were returned.

Sixty-eight percent of the teachers responded to the opinionnaire, with the number of responses varying by school and by grade level. These totals are presented in Tables 14 and 16.

The modes of analysis were correlation, factorial design and t-test. The level of significance was set at .05 for all statistical tests. The following comparisons were made:

Comparison	Statistic
1. Relation between opinion of Outdoor Natural Science field trips (NS score) and number of Math-Science hours taken in college.	Correlation Coefficient
2. Relation between NS score and number of field trips taken.	Correlation Coefficient
3. Relation between NS score and number of science field trips taken.	Correlation Coefficient
4. Relation between the number of field trips taken and number of science field trips taken.	Correlation Coefficient

	Comparison	Statistic
5.	Relation between NS score and number of years taught in district.	Correlation Coefficient
6.	Relation between NS score and age of teacher.	Correlation Coefficient
7.	Relation between rank of science among eleven curriculum areas taught in the school and the number of science field trips taken.	Correlation Coefficient
8.	Significance of the difference in mean NS score between bachelor and master degree teachers.	t-test
9.	Significance (1) from zero and (2) differences among schools of the mean NS score and general management and utility of field trips (MUT score) score.	Simple Randomized Design
10.	Significance (1) from zero and (2) differences among grade levels of the NS score and MUT score.	Simple Randomized Design
11.	Significance of the differences in field trip opinion scores (1) among the four scales (UT, MT, AF and NS)and (2) among the teachers.	Randomized Blocks Design

A total of 121 teacher opinionnaires were returned for this investigation. However, since several teachers failed to respond to all the questions, only one of the analyses included 121 respondents. The minimum number included in an analysis was 106.

Results

The extent to which teachers, as individuals and in subgroups, view the ONSL positively can be termed the "relative success" of the project, as perceived by these teachers.

The results of this investigation (1) indicate a few of the teacher characteristics which seem to affect the relative success of the project, (2) reflect the relative success of the project as perceived by teachers, and (3) provide descriptive and comparative information on teachers' opinions of the field trips method of instruction.

The teachers were to indicate the number of math-science semester hours they had obtained by checking one of six intervals: 0-6, 7-12, 13-18, 19-24, 25-30, 30+. For correlational analysis these categories were assigned values of 1 through 6, respectively. The mean value was 3.45 which indicates that the typical teacher would probably have between 13-18 math-science hours. There was virtually *no relation* found between teachers' math-science training and their opinion concerning outdoor natural science field trips (see Table 7). This would indicate that the relative "success" of the project is independent of the teachers' math-science background.

TABLE 7

Relation Between Math-Science
Semester Hours Credit and NS Score

Variable	N	Mean	SD	Variance	Covariance	r
Math-Science Hours	106	3.45	1.30	1.68	0.54	+.039
N.S. Score	106	76.66	10.80	116.72		

The number of field trips a teacher takes during the school year should reflect his feelings toward them as a mode of instruction. Therefore, the respondents were asked to list all the field trips they had taken and were scheduled to take for the 1968-1969 school year. This frequency was used as a criterion for analyzing their expressed opinions toward natural science field trips (NS score). The results indicated a low positive relation between the two variables (see Table 8). This suggests that those teachers who most often utilize field trips as a mode of instruction tend to have more positive opinions toward ONSL field trips than do those teachers who do not utilize field trips as frequently. However, the relation is low.

TABLE 8

Relation Between NS Score and number of Field Trips

Variable	N	Mean	SD	Variance	Covariance	r
N.S. Score	119	75.58	11.37	129.22	6.46	+.223
Number of Field Trips	119	4.27	2.55	6.51		

Extracted from the list of field trips taken during the school year was the number that were Outdoor Natural Science ones. This number should reflect the teachers' feelings toward field trips as a mode of instruction for Outdoor Natural Science. Therefore, this frequency was used as a criterion for analyzing the teachers' opinions toward natural science field trips (NS score). The results reflect a medium positive relation between the two variables (see Table 9). This indicates that those teachers who most often utilize natural science field trips tend to have more positive opinions toward ONSL field trips than do those teachers who do not utilize natural science field trips as frequently. However, this is a low-medium relation.

Of interest is the comparative relations between NS score and the number of field trips and between NS score and the number of science field trips (+.223 and +.328, respectively). This suggests that the NS score is more highly related to the frequency of taking natural science

TABLE 9

Relation Between NS Score and Number of Science Field Trips

Variable	N	Mean	SD	Variance	Covariance	r
N.S. Score	117	76.75	11.65	129.17	3.44	+.328
Number of Science Field Trips	117	0.81	.90	.82		

field trips than to taking field trips in general. (This is strengthened somewhat by the fact that the number of field trips and number of science field trips are relatively highly correlated, which is presented later.) This lends support to both the relative "success" of the ONSL sponsored field trips and to the validity of the opinionnaire. If the number of natural science field trips taken and the NS score both reflect the teachers' feelings toward the program (except that *different* factors interact with each of the measures) then they should be positively correlated. This result, then, of a medium positive relation, supports the logical validity claimed for the instrument. The fact that this relation is higher than that found between NS score and the total number of field trips taken might suggest a positive teacher reaction to field trips taken during 1968-1969 school year. However, it is impossible to determine whether this effect is the result of teacher self-selection or the result of "successful" ONSL field trip experiences.

The relation between the total number of field trips taken and the number of science field trips taken was the highest one determined, with r = +.455 (see Table 10). This indicates that the greatest single factor in determining which teachers are most likely to utilize the services provided through the ONSL project are those teachers that most often utilize field trips as a mode of instruction, and the converse.

TABLE 10

Relation Between Number of
Field Trips and Number of
Science Field Trips

Variable	N	Mean	SD	Variance	Covariance	r
Number of Field Trips	120	4.21	2.58	6.65	1.043	+.455
Number of Science Field Trips	120	0.79	0.90	0.82		

Even though this is not surprising, it suggests that the teacher-naturalists have not been as successful as might be desired in getting teachers who normally take few field trips to utilize the services provided through the project in teaching outdoor natural science. This might further suggest that during the final stages of the project, the teacher-naturalists should allot a larger portion of their time to working with individual teachers in the schools in order to increase the utilization of ONSL field trip facilities. This is also indicated from the mean number of science field trips taken by the teachers, 0.79 (see Table 10). The typical teacher utilizes the teacher-naturalists' services less than once a year.

Of general interest in this investigation were the relations between the NS score and the number of years a teacher has taught in the University City School District, and the teacher's age. Low, but positive, correlations were found in both of these analyses (see Table 11). These results indicate that the older, established teachers tend to be more favorable toward the ONSL program than are the young, beginning ones.

TABLE 11

Relation Between NS Score,
Number of Years Taught in
District, and Age of Teacher

Variable	N	Mean	SD	Variance	Covariance	r
N.S. Score	118	75.40	13.12	172.10	32.66	+.280
Years Taught	118	9.32	8.88	78.84		
N.S. Score	118	75.46	12.63	159.55	37.65	+.226
Age	118	41.51	13.22	176.74		

This might be the result of the teacher-naturalists' interaction with teacher subgroups or it might be the result of any of several concommitment variables influencing these teacher subgroups in a differential manner. Regardless of the reason, however, this low, positive relation along age, experience lines does seem to exist.

A possible variable of interest to the success of this project is the relative importance individual teachers place on science in the curriculum. In order to ascertain this, the teachers were requested to rank order 11 curriculum areas (including science) commonly taught in the schools. The rank assigned to science was used as the index of the importance placed by the teacher on this area. It was hypothesized by the researchers that if this variable is a factor in the successful operation of the ONSL project, it should correlate negatively with the number of science field trips taken (*i.e.*, the higher the rank assigned, with 1 being highest and 11 lowest, the larger the number of science field trips taken). The correlation was negative, but for practical purposes it was equal to zero (see Table 12).

TABLE 12

Relation Between Rank of Science in School Curriculum and Number of Science Field Trips

Variable	N	Mean	SD	Variance	Covariance	r
Science Rank	111	5.45	1.89	3.56	-.074	-.043
Number of Science Field Trips	111	0.85	0.91	0.83		

Therefore, it is concluded that the relative importance of science in the curriculum as perceived by the teacher has *no* relation to the success of the ONSL project.

Another variable of possible interest was the level of training of the teacher. The teachers were categorized as either bachelor or master degree teachers (they were requested to indicate highest degree obtained). To analyze the importance of this variable, the difference between the mean scores on the NS scale for the two groups was tested using a t-test. The difference was *not* significant (see Table 13), indicating that training as reflected by the highest degree obtained was not significantly related to teachers' opinions of the ONSL field trips.

TABLE 13

Significance of the Difference Between Mean NS Scores for Bachelor and Master Degree Teachers

Degree	N	Mean	SD	SE	t	df	Significance
Bachelor's	76	74.74	15.75	2.63	-1.00	116	$P > .05$
Master's	42	77.37	12.20				

Of particular importance to the evaluation of the ONSL project are teachers' opinions of the management and utility of field trips conducted by the teacher-naturalists (NS score) as compared to their opinion [illegible] management and utility of field trips in general (MUT score). T[illegible]ce between the means on these scales were compared using factorial designs. Since these were correlated measures (*i.e.*, an NS score and MUT score for each individual), the differences between the scores for each teacher (*i.e.*, NS-MUT) were the scores analyzed.

These data were analyzed first by school, and then by grade level. Because of small sample sizes, these designs had to be run separately. The mean difference scores for the schools are presented in Table 14, and the means for

TABLE 14

Mean Differences Between NS Score and MUT Score by School

School	N	Mean
Sixth Grade Center (6) Blackberry Lane (5) Greensfelder Park (3)	14	+1.36
Daniel Boone	10	+6.15
Delmar-Harvard	15	+4.37
Flynn Park	14	+9.39
Jackson Park	19	+6.03
McKnight	12	+4.12
Nathaniel Hawthorne	10	+1.93
Pershing	15	-2.83
University Forest	10	-3.03

grade levels are reported in Table 16. Due to insufficient numbers of returns, the Sixth Grade Center, Blackberry Lane, and Greensfelder Park were pooled for statistical analysis. The remainder of the schools are reported individually.

The mean difference score was found to be significantly greater than zero ($\alpha = .05$), and the mean differences were significantly different among schools.

TABLE 15

Significance of the Difference Between _NS Scores_ and _MUT Scores_, By School

Source of Variance	SS	df	MS	F
Mean	1272.9129	1	1272.9129	12.1626*
Schools	1804.0322	8	225.5040	2.1547*
Within	11512.3549	110	104.6578	

*Significant at the .05 level of confidence

TABLE 16

Mean Differences Between _NS Score_ and _MUT Score_ by Grade Level

Grade Level	N	Mean
K	8	-3.15
1	21	+1.22
2	20	+4.62
3	18	+1.73
4	21	+4.60
5	18	+6.14
6	13	+4.46

These results are summarized in Table 15. The differences among schools can be noted from Table 14.

These results indicate that the elementary teachers tend to react more positively toward the management and utility of the ONSL field trips than toward field trips in general. This speaks favorably toward the teacher-naturalists, the general utility of their program, and their interaction with teachers as perceived by the elementary teachers in the district. However, these successes are not consistent across groups; they are related to specific schools. The significance of specific differences between pairs of schools is not of interest here, but the extreme differences are. The highest positive means (NS-MUT) were associated with Flynn Park, Daniel Boone and Jackson Park, respectively, and the negative ones with University Forest and Pershing. There are many possible explanations of these differences, all of which need to be investigated before any general conclusion can be reached.

Significant differences did not appear when analyzing the data by grade levels (see Table 17). Any difference in means noted in Table 16 can be contributed only to chance. Consequently, the relative impact of the program,

TABLE 17

Significance of the Difference
Between NS Scores and MUT Scores,
By Grades

Source of Variance	SS	df	MS	F
Mean	1272.9129	1	1272.9129	11.4013*
Grade	700.3604	5	140.0721	1.2546
Within	12616.0267	113	111.6462	

*Significant at the .05 level of confidence as seen by teachers, seems to be independent of the grade level programs.

The significance of the differences among the four opinion scales (UT, MT, [illegible] and NS) were analyzed using a randomized blocks design, with the four scales as treatments and the 119 teachers as blocks. Both the treatment and block effects were significant. The treatment means are reported in Table 18, and the summary statistics for the randomized blocks design are presented in Table 19.

TABLE 18

Mean Scores on the Teacher Opinionnaire Scale

Scale	N	Mean*
UT	119	76.58
MT	119	67.61
AF	119	65.12
NS	119	75.58

*All means are significantly different (except UT and NS) at the .05 level using the Tuckey Standardized-Range Multiple Comparisons Test; critical difference = 2.30.

TABLE 19

Significance of the Differences Among the Scales, By Teachers

Source of Variance	SS	df	MS	F
Scales	12178.71	3	4059.57	86.32*
Teachers	59220.60	118	501.02	10.65*
Scales by Teachers	16717.49	354	47.03	

*Significant at the .05 level of confidence.

The significant teacher effect indicates that there are consistent differences among teachers in the manner in which they view field trips. Some teachers react in a consistently high positive manner on all four aspects of field trips, while others in a consistently less positive (or negative) manner.

The significant treatment was further analyzed by testing the significance of the differences between the scale means (see Table 18). The Tuckey Standardized Range Multiple Comparisons Tests showed all four means to be significantly different from each other, except those means for the UT and NS scales. The rank order of these means (as significantly different) was UT and NS, MT, and AF. These results suggest that teachers perceive the following:

1. That there is relatively high positive utility to field trip experiences in general.
2. That the ONSL field trips are "good" trips in respect to both their utility and management (Using UT as the criterion for "good", with MT significantly below "good").
3. That the management of field trips in general is perceived as less satisfactory than either that of the ONSL trips, or the possible utility of field trips in general.
4. That affective characteristics (noisy students, etc.) comprise the greatest single concern of teachers about field trips. Even though the mean score is in the positive direction, this concern reflects a greater amount of negative feeling than do any of the other concerns.

Conclusions

This investigation consisted of gathering data concerning the relative status teachers ascribed the field trips provided by the ONSL program. Related data concerning three aspects of field trips in general were gathered to provide criteria measures. Selected teacher variables (*e.g.'s*, age, highest degree obtained, etc.) were analyzed for their relation to teachers' opinions and utilization of outdoor natural science field trips.

An opinionnaire was constructed to yield these types of data. It was administered to 121 elementary teachers in the University City School District.

Analyses revealed the following:

1. *The highest correlate of teacher participation in the* ONSL *field trips is the teacher's actual use of field trips for instructional purposes (i.e., number of field trips taken during the year).*
2. *The second high correlate of teacher participation in* ONSL *field trips is the teacher's opinion toward the* ONSL *series of trips, their utility and management.*
3. *No relation is apparent been teachers' feelings toward or utilization of* ONSL *field trips and (a) the number of hours of math-science training the teacher has had, (b) the relative rank of importance teachers assign to science among other curriculum areas, or (c) the highest degree obtained by the teacher.*
4. *Positive, but low, relations exist between the teachers' feelings toward or utilization of* ONSL *field trips and (a) age of the teacher and (b) number of years taught in the district.*

5. *The management and utility of the* ONSL *field trips is perceived more positively by the teachers than is the management and utility of field trips in general. This result, however, is dependent upon the school in which the teacher is located.*
6. *As perceived by the teachers, the* ONSL *field trips are of equivalent quality to other field trips, and they are superior to the management of field trips in general.*
7. *Affective characteristics (student disciplines, etc.) are the greatest concern to teachers in respect to the field trips method of instruction.*

PART VII

FIELD TRIP OPINION SCALE: ITEM ANALYSIS

Purpose

Throughout this report the primacy of the field trip as the means of instruction for the ONSL project has been emphasized. Accordingly, the majority of the studies have dealt with several aspects of these field trip offerings. The preceding section, PART VI, presented the results of the opinionnaire administered to the elementary teachers in the district which measured their attitudes toward the utility and management of the Outdoor Science offerings in comparison with educational field trips in general. The data reported in that section consisted of statistical comparisons of the scale-scores on the Field Trip Opinion Scale. Those data explicated the variables which were related to teacher utilization of and opinion toward the ONSL field trips.

Since the attitude of teachers toward the Outdoor Natural Science Laboratory field trips in terms of their educational utility, ease of management, and the affective considerations involved is considered to be highly important, these opinions should be fully described. This part of the report, therefore, will present item results on the Field Trip Opinion Scale. These data should provide additional insight into the manner in which the teachers who responded to the opinionnaire viewed the educational experiences offered through the ONSL project. By viewing data ordered in this manner, the *range of opinion* of the population becomes more readily observable.

Procedure

The construction of the Field Trip Opinion Scale and its administration have been described in Part VI. The analyses performed in order to explicate those relations which were found to exist among scales and variables have been reported. The instrument, as was previously described, contained four scales. These scales were: 1, Educational Utility of Field Trips in General, denoted (UT); 2, Management of Educational Field Trips in General, denoted (MT); 3, Affective Concerns Associated with Educational Field Trips in General, denoted (AF); and 4, Educational Utility and Management of Outdoor Natural Science Field Trips, denoted (NS).

The items were arranged in a sequential manner on the opinionnaire, with one item from each scale appearing in turn, in order to reduce the possibility of a response "set". The response categories consisted of a four-point Likert-type scale, permitting the respondents to mark *STRONGLY AGREE, AGREE, DISAGREE*, or *STRONGLY DISAGREE*. No neutral response was permitted. This mode of responding provided data on the extent to which teachers, as individuals and as subgroups, viewed the ONSL trips positively or negatively.

The statistical comparisons between means for the four scales and for the teacher variables permitted analyses which revealed correlates of teacher participation in and opinion toward the particular set of field trips under consideration. The mode of analysis in this section consisted of determining the percentage of the responses for each category in the four-point scale. This presents a view of the *range of responses* as well as the *mean response* for each item.

On the following pages, the items comprising the four scales are listed in numerical order within each scale. The data are reported using histograms of the responses of the 121 teachers for each item. The vertical axis represents the relative percentage of teachers responding by category, and the horizontal represents the response categories: Strongly Agree (SA), Agree (A), Disagree (D), Strongly Disagree (SD). The data for the Educational Utility of Field Trips in General (UT) are presented in Exhibit 1.

Results

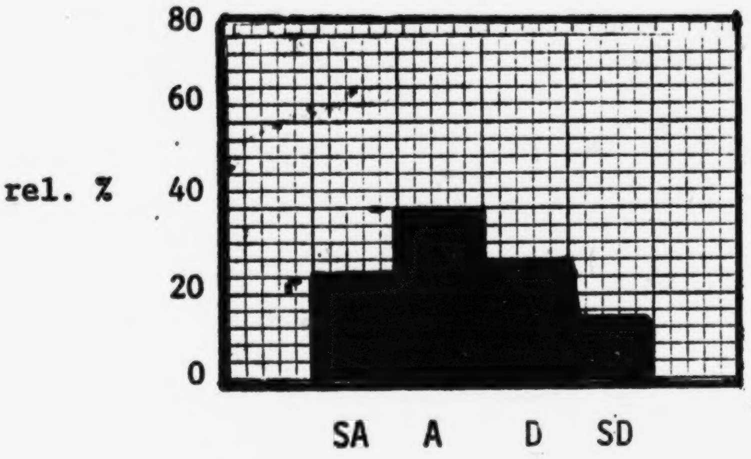
Clearly, the majority of teachers perceived educational utility accruing from field trips. Items number 5 and 9 indicate the extent to which the sample disagreed strongly with a statement negative toward field trips and agreed strongly with a statement supporting field trips. Furthermore, the responses to this pair of items is striking due to the fact that respondents typically do not mark the extreme categories on this type of instrument. The *majority* of respondents indicated that field trips: (1) are useful and desirable because they provide for a change in the classroom routine, (2) are an effective teaching device for presenting both *concepts* and *knowledge*, (3) provide unique experiences, and (4) add to pupil enjoyment.

A substantial *minority* of the respondents reported that they felt field trips provided relief from the pressures of daily teaching. Classroom preparation for a field trip was perceived as being generally inadequate by nearly 30% of the sample. A smaller minority (slightly less than 25%) expressed the opinion that classroom follow-up was inadequate as well.

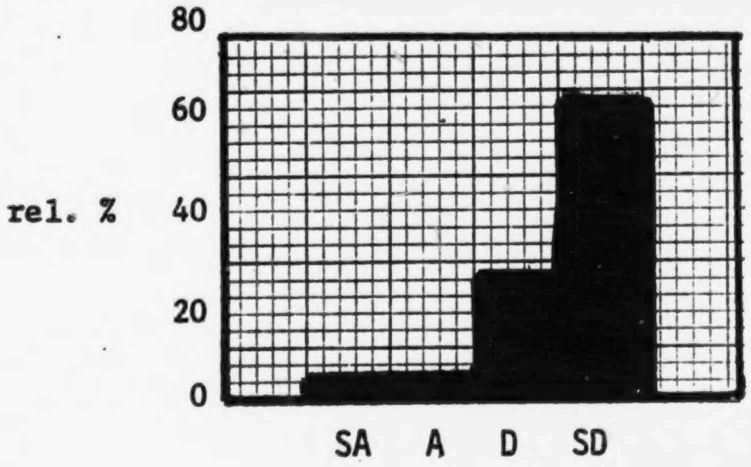
The data for the Management of Educational Field Trips in General scale are presented in Exhibit 2. The majority of respondents indicated that they felt they were provided with sufficient information concerning available field trips, and were familiar with the routine to follow in order to schedule a field trip. Less than 20% indicated lack of knowledge about those aspects of trip management.

Most of the respondents perceived few problems in terms of fitting trips into their schedules or in terms of the frequency of trips at one time of year. However, a substantial minority (29%) did see these as problem areas. Slightly fewer indicated the same feelings concerning pre-scheduled (*i.e.*, not teacher initiated) field trips. Few respondents expressed dissatisfaction with "red tape" involved, or with the transportation available for field trips.

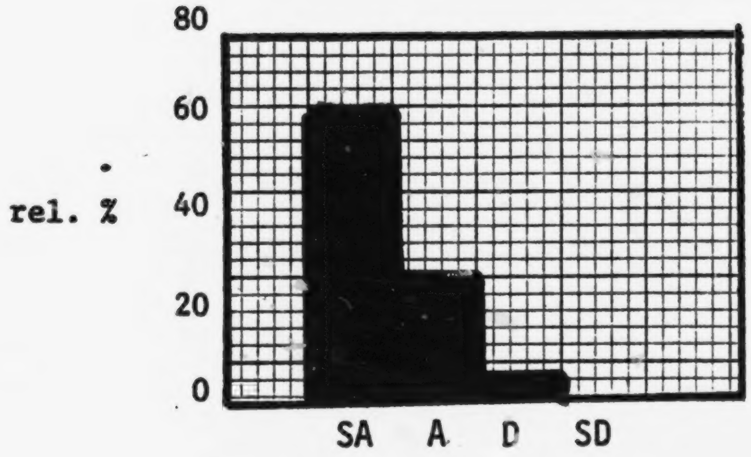
Exhibit 1: Scale: Educational Utility of Field Trips in General



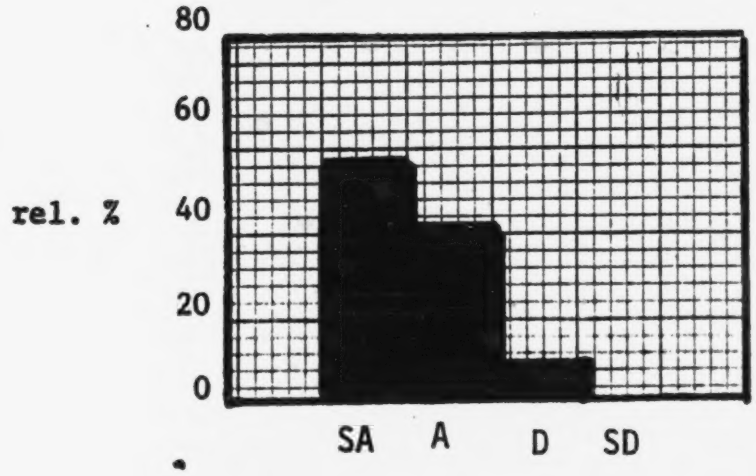
1. Field trips are desirable because they provide for an occasional change in classroom routine.



5. Field trips are difficult to justify educationally.

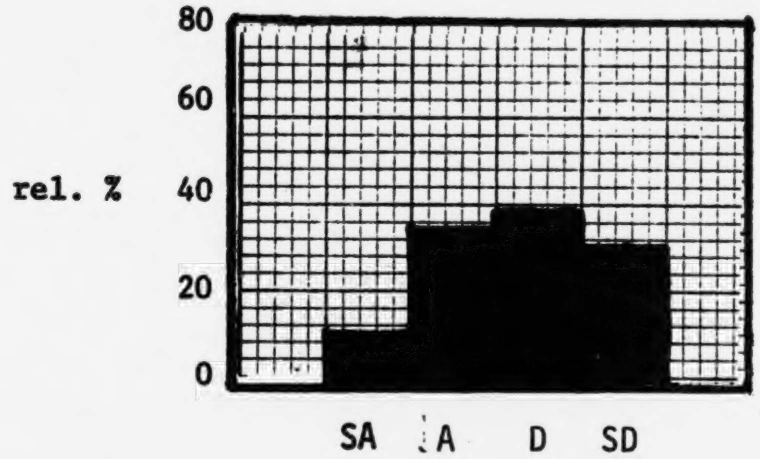


9. Field trips are effective as a teaching device.

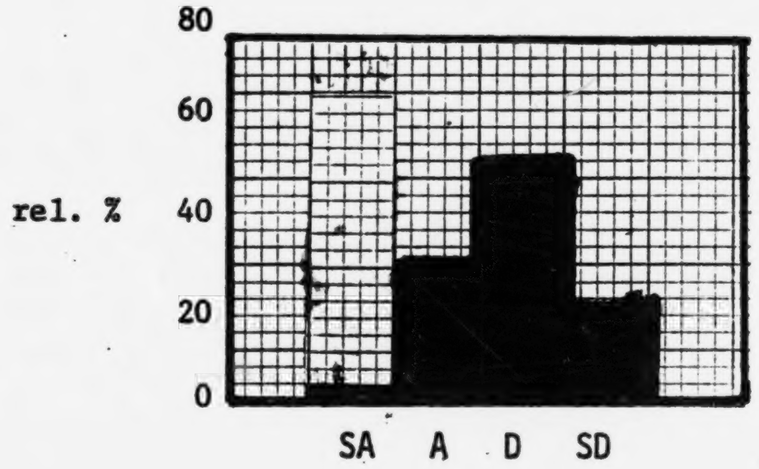


13. Field trips provide unique experiences.

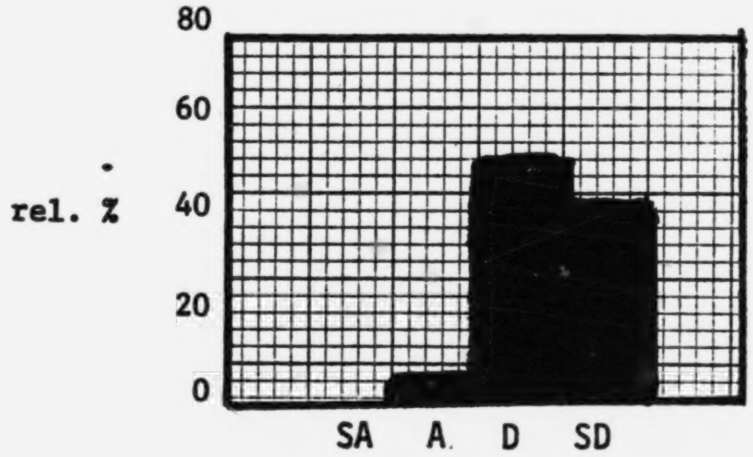
Exhibit 1: Scale: General Utility of Field Trips



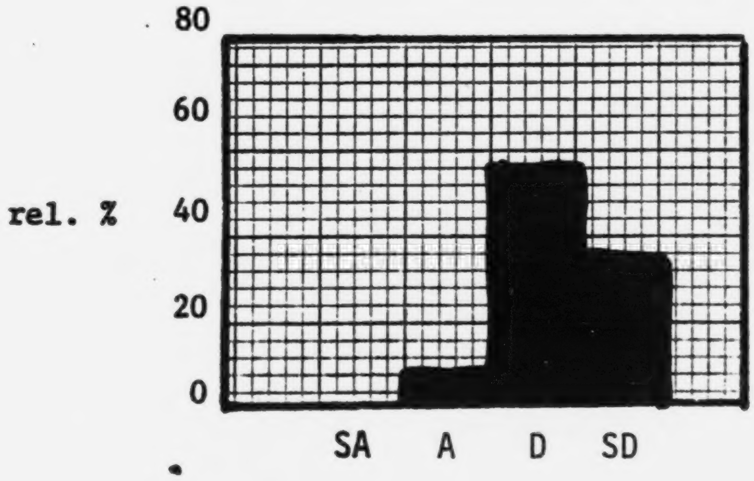
17. Field trips provide relief from the pressure of daily classroom teaching.



21. Classroom "lead-up" to a field trip is generally inadequate.

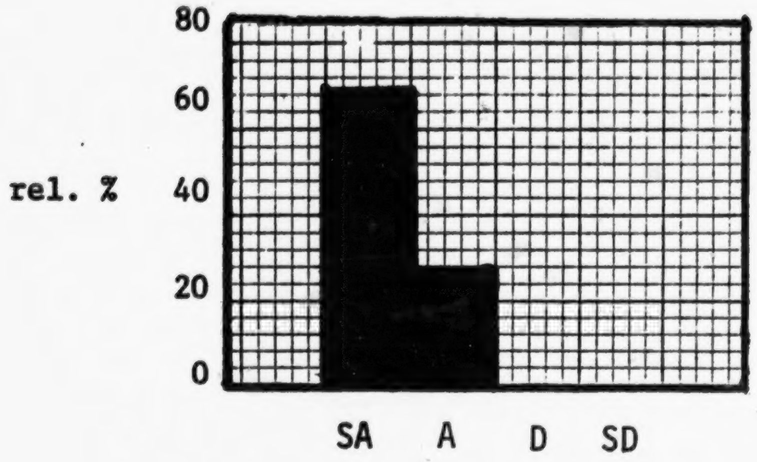


25. Information taught by means of field trips could be taught as well or better in the classroom.

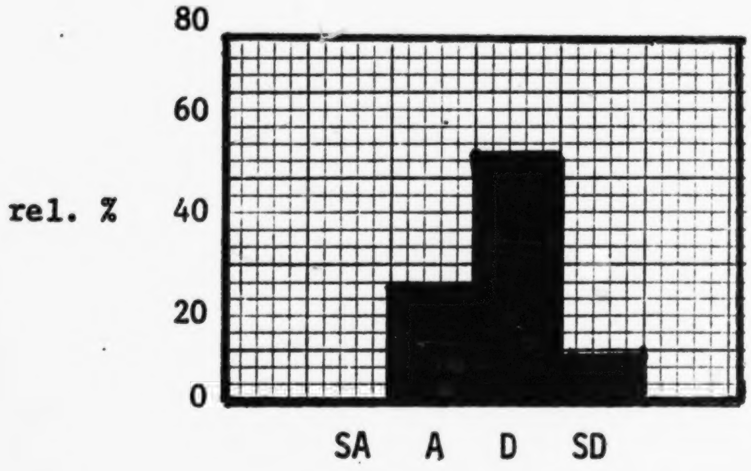


33. Concepts taught by means of field trips could be taught as well or better in the classroom.

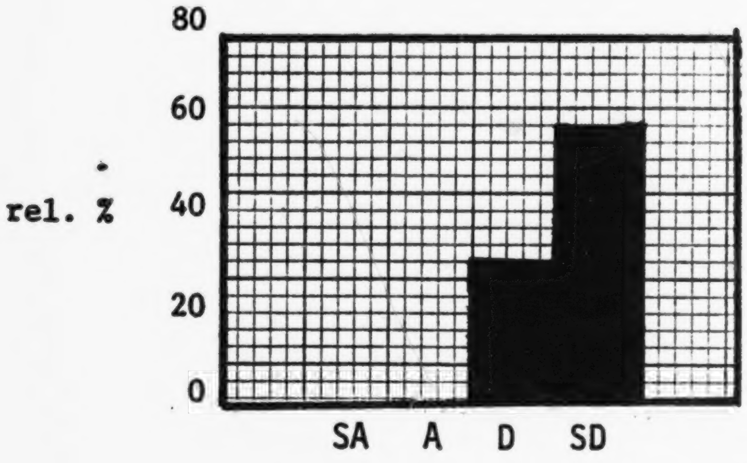
Exhibit 1: Scale: General Utility of Field Trips



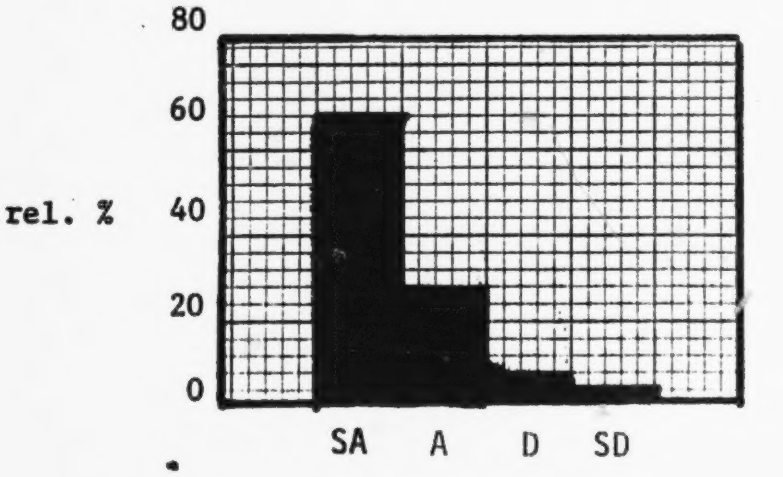
37. Pupils like to go on field trips.



41. Classroom follow-up of a field trip is generally inadequate.

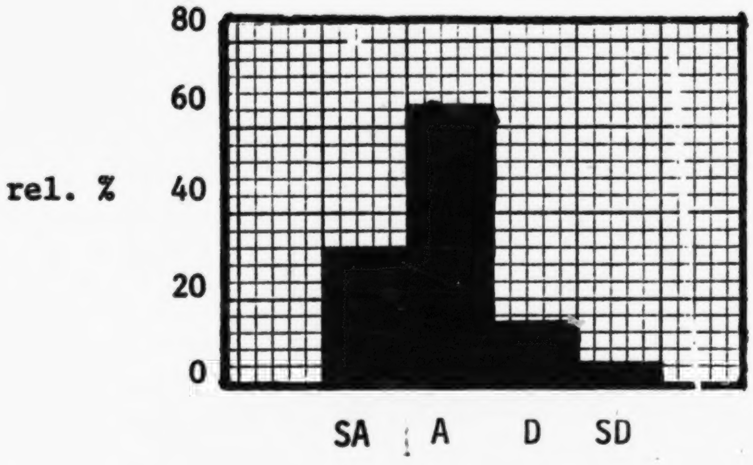


49. Field trips are not effective as a teaching device.

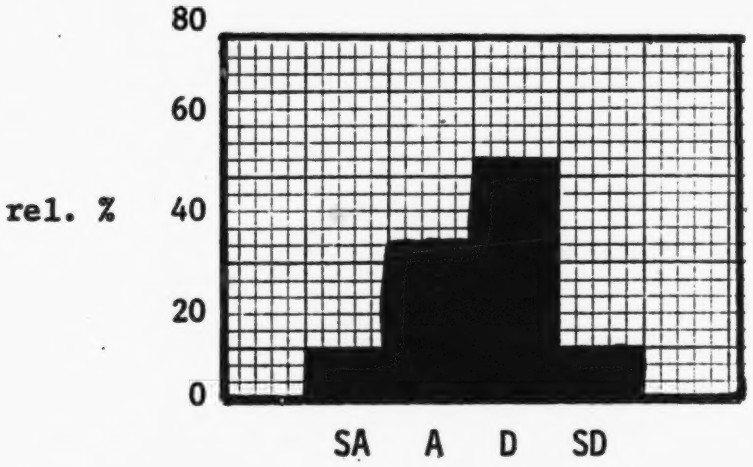


53. Field trips are useful.

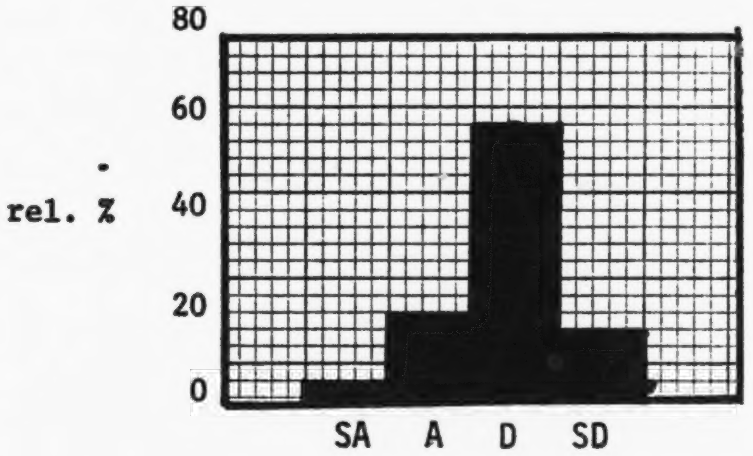
Exhibit 2: Scale: Management of Educational Field Trips in General



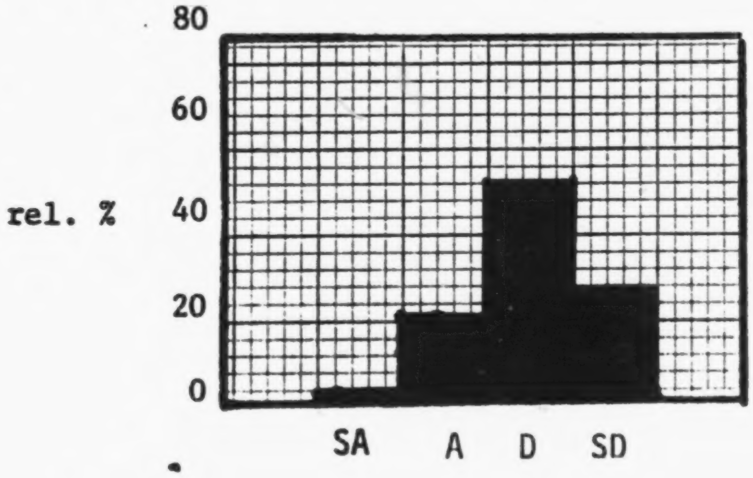
2. You are provided sufficient information about the nature, places, time, etc., concerning possible field trips.



6. Often the object or event you want your class to see is not available at a convenient time to supplement your program.

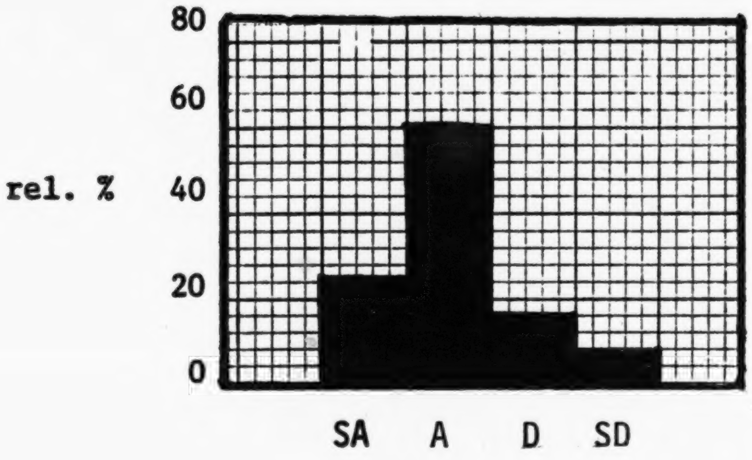


10. The field trips you think are most useful seem to fall at about the same time of year.

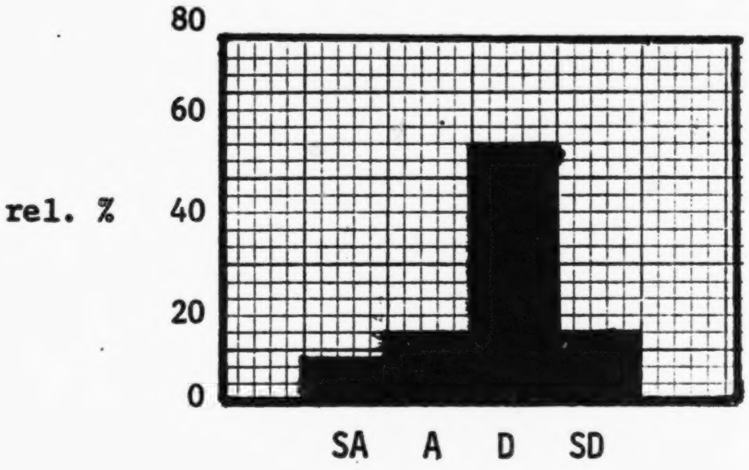


14. You often decide not to schedule field trips due to the difficulty of fitting them into your teaching schedule.

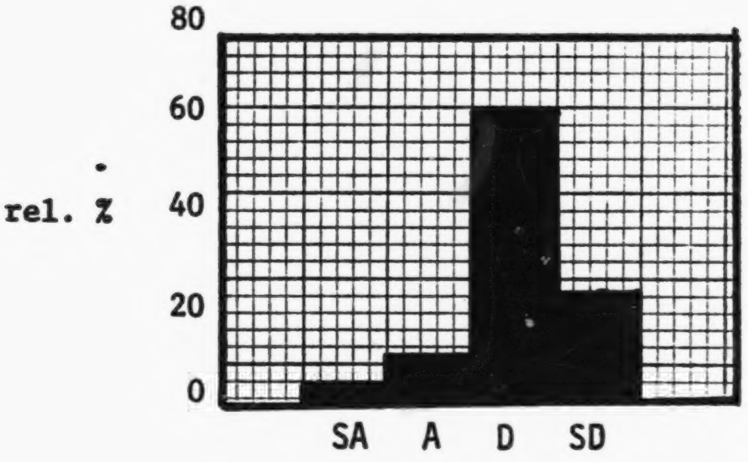
Exhibit 2: Scale: Management of Educational Field Trips in General



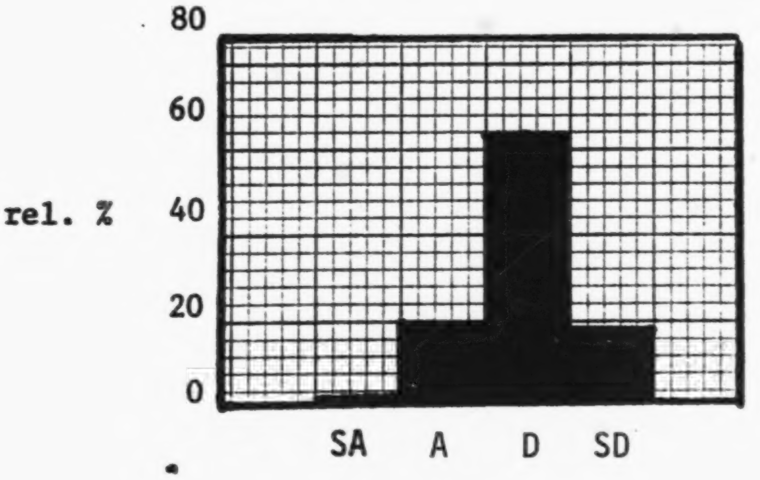
18. You have been informed of the routine to follow in scheduling field trips.



22. There is too much "red tape" involved in arranging field trips.

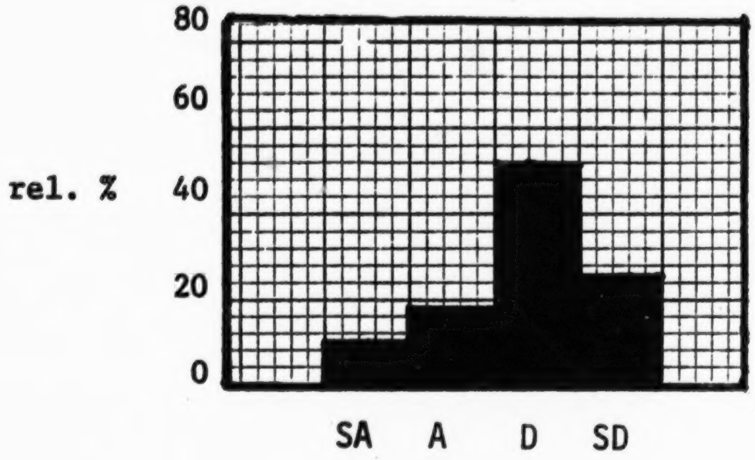


26. Outside field trip coordinators (*e.g.*, museum and plant guides, teacher specialists, etc.) are not sufficiently reliable.

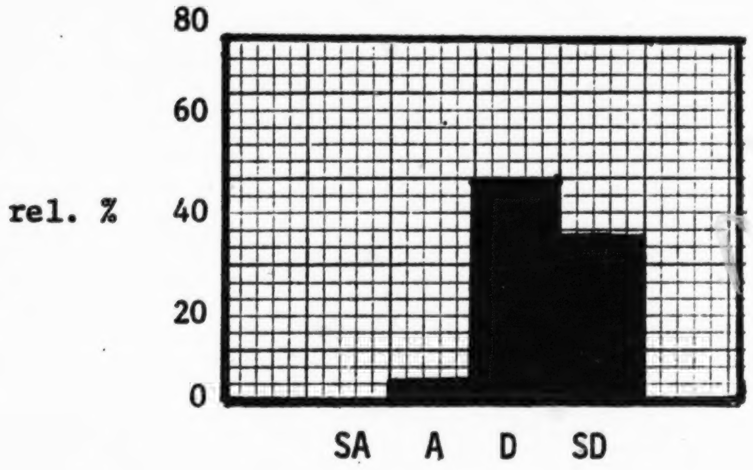


34. The actual field trip experience often has been disappointing because of the lack of adequate presentation.

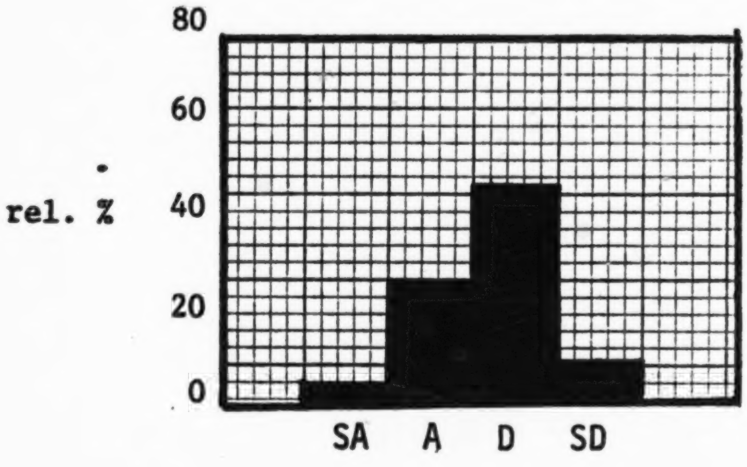
Exhibit 2: Scale: Management of Educational Field Trips in General



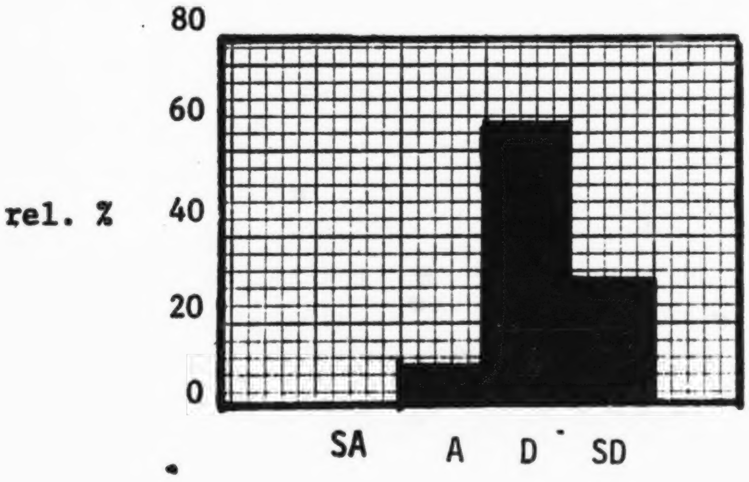
38. Appropriate transportation is not available for field trips.



42. Bus transportation is generally too uncomfortable for the enjoyment of field trips.



46. Prescheduled (*i.e.*, not teacher initiated) field trips occur at inappropriate times to supplement your unit of study properly.



54. Factors beyond your control (*e.g.*, rain, illness, poor guides) affect your willingness to schedule field trips.

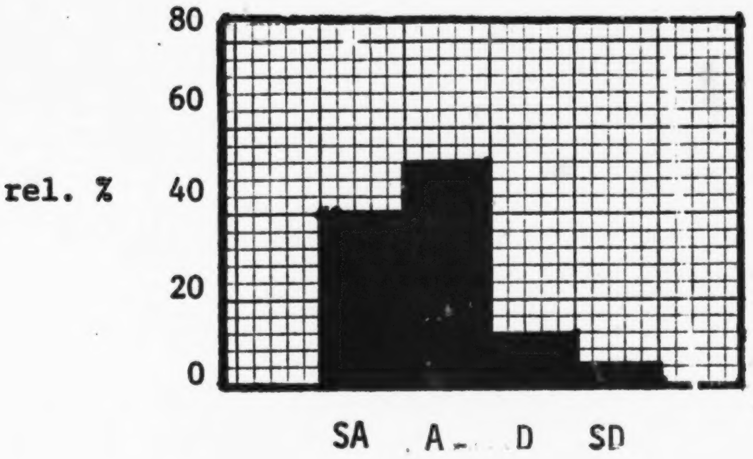
Exhibit 3 presents the data for the scale, Affective Concerns Associated with Educational Field Trips in General. The data indicate that the majority of teachers do not see principal's, parent's, or other teacher's views as factors in determining whether they take or do not take field trips with their classes. Concern for the safety of the class or legal responsibility for them do not seem to be factors inhibiting teachers from taking their class on trips.

The respondents saw relatively few problems with the behavior of their class while on a field trip. Indeed, most responded that their class' behavior compared favorably with students from other schools on the same trip. It should be noted that combined with these positive overall findings, a strong minority (about 33%) seemed to feel some doubt about their personal adequacy for conducting field trips.

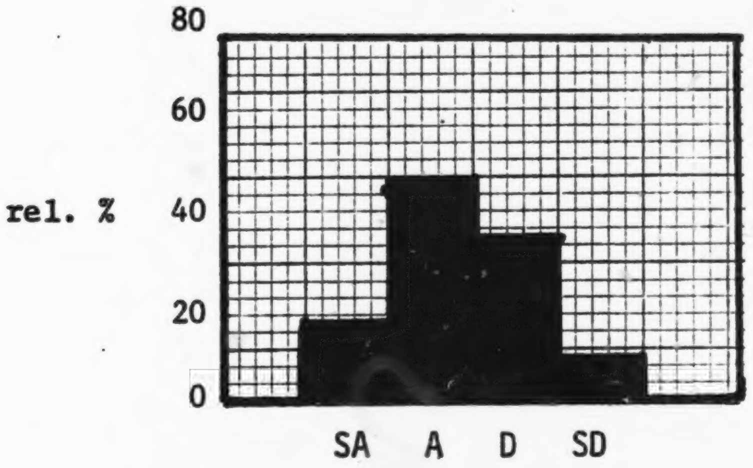
The last scale on the Field Trip Opinion Scale deals with the teachers' opinions respecting the General Utility and Management of the Outdoor Natural Science Laboratory Field Trips. The data are presented in Exhibit 4. The attitude of the respondents lies heavily in the direction favorable to the series of trips offered by the teacher-naturalists. Specifically, teachers indicate: (1) the ONSL field trips are useful for teaching both science information and science concepts; (2) the preparation and follow-up to the trips are deemed adequate (these are performed by the teacher-naturalists); (3) the teacher-naturalists are seen as reliable field trip co-ordinators; (4) the trips are viewed as being well-managed, with "good" presentations; (5) the trips are liked by pupils; and (6) the teachers expressed an interest in teaching the topics for which the project staff has available trips.

Among the items in the UT, MT, and AF scales were several which were mirrored in the NS scale; that is, they were restated from the ONSL trips frame-

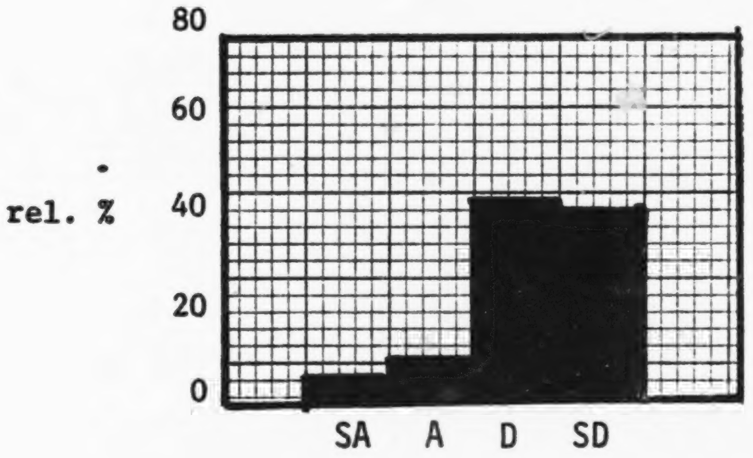
Exhibit 3: Scale: Affective Concerns Associated with Educational Field Trips in General



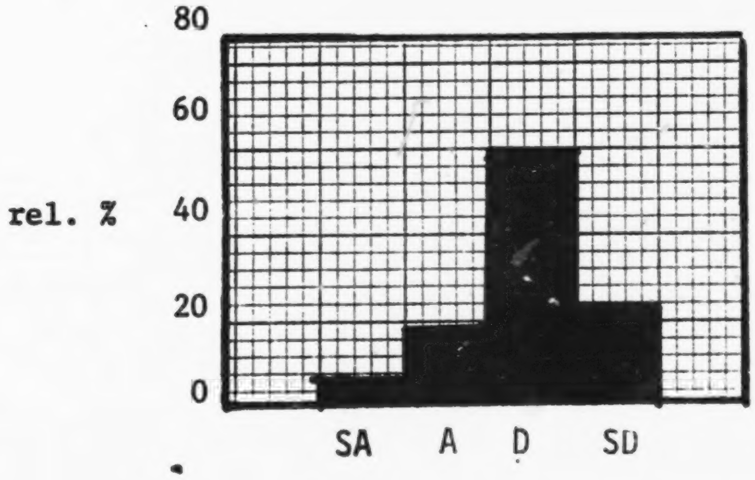
3. You find that the behavior of your class compares favorably with that of students from other schools who are on the same field trip.



11. You embark on field trips with no doubts concerning your personal adequacy in the situation.

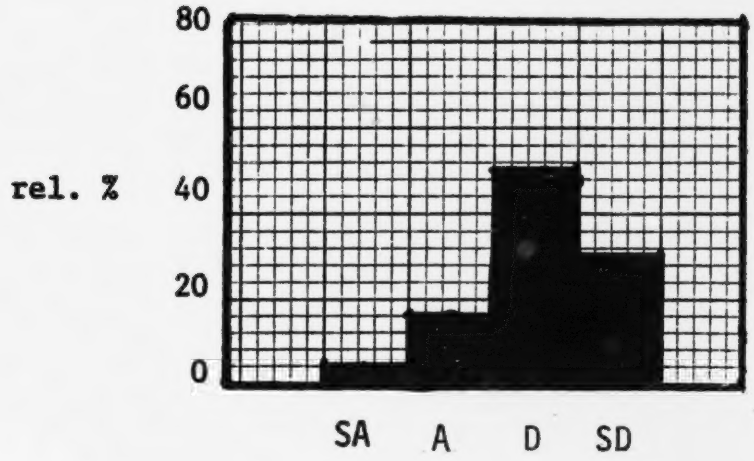


15. You find it difficult to manage your class while on a field trip.

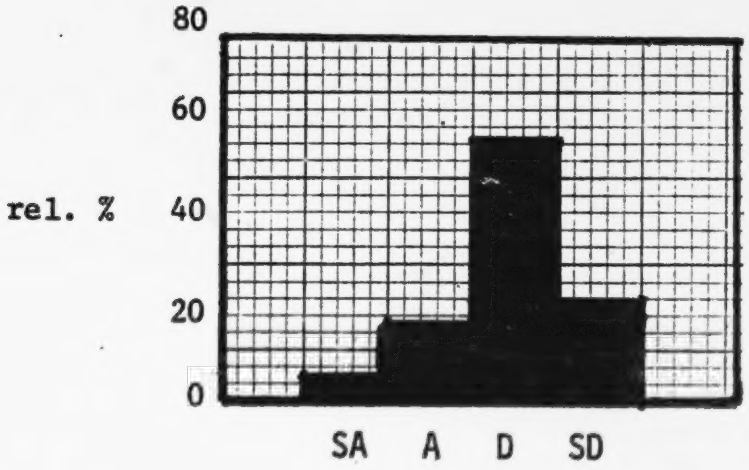


19. You feel that pupils become too noisy on field trips.

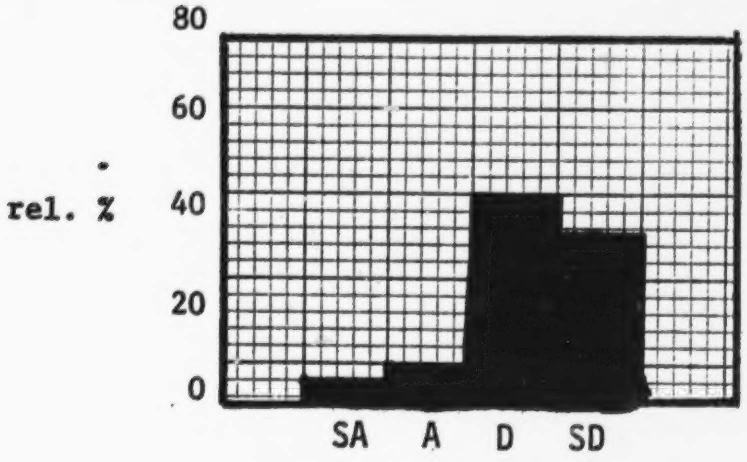
Exhibit 3: Scale: Affective Concerns Associated with Educational Field Trips in General



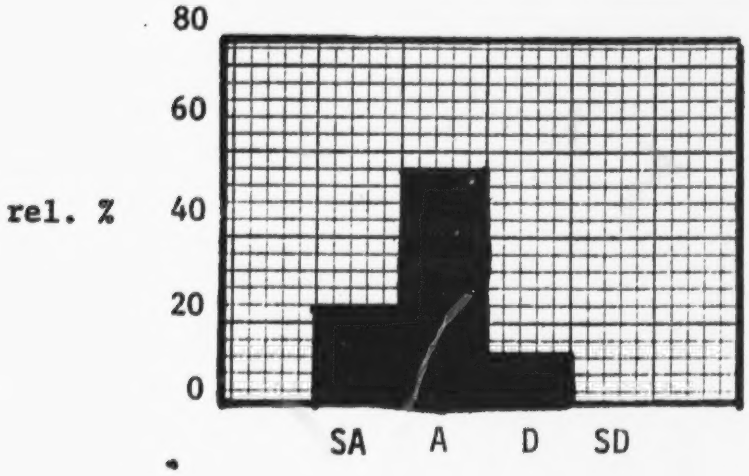
23. You think that the principal will evaluate you more positively if you take your class on field trips.



27. You think that teachers who take a number of field trips are considered "creative" by the other teachers.

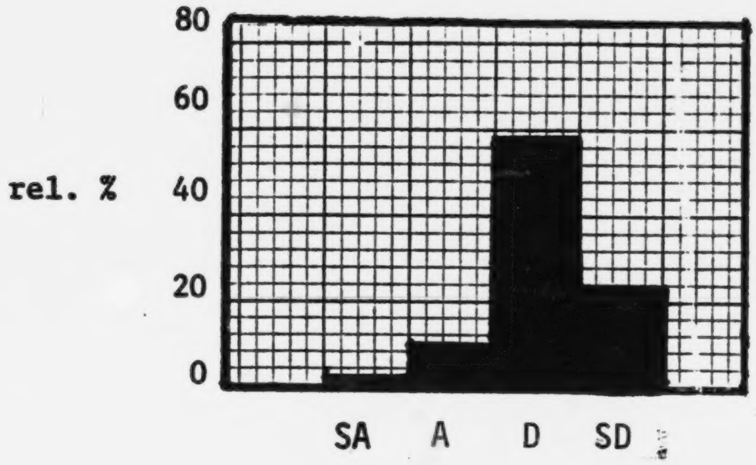


31. The possibility that others might consider you legally responsible if a child should get hurt on a field trip has prevented you from scheduling some field trips.

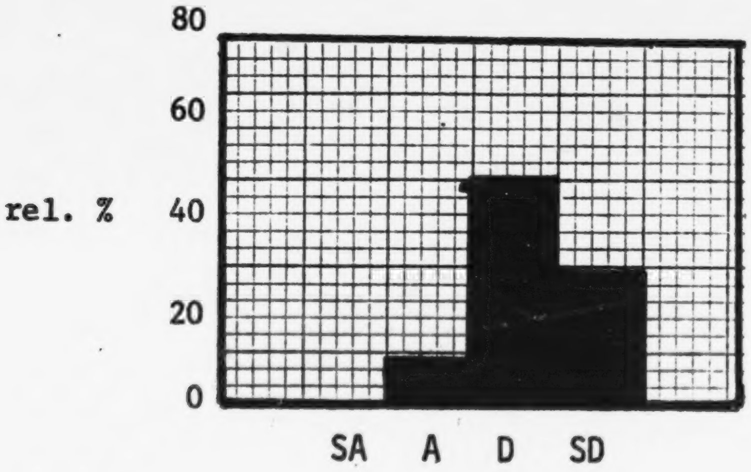


35. You think that parents consider you a better teacher if you take field trips.

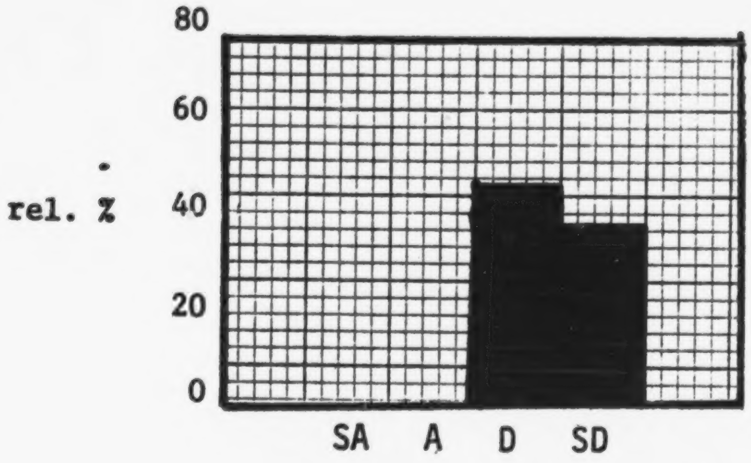
Exhibit 3: Scale: Affective Concerns Associated with Educational Field Trips in General



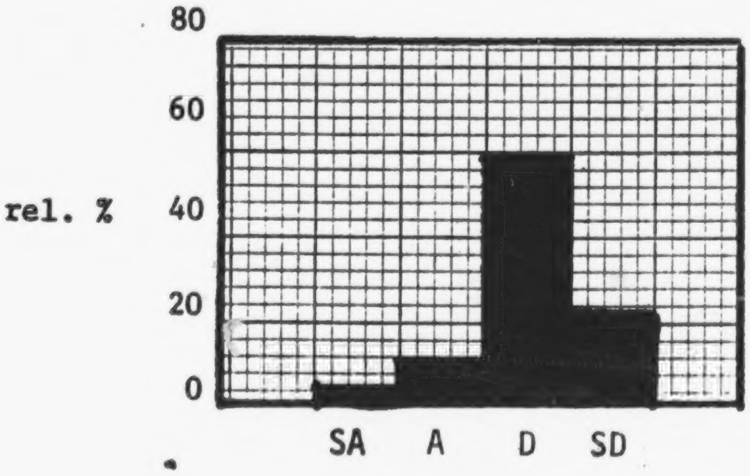
39. Pupils' behavior is often embarrassing on field trips.



43. Concern for the safety of the pupils has prevented you from scheduling some field trips.

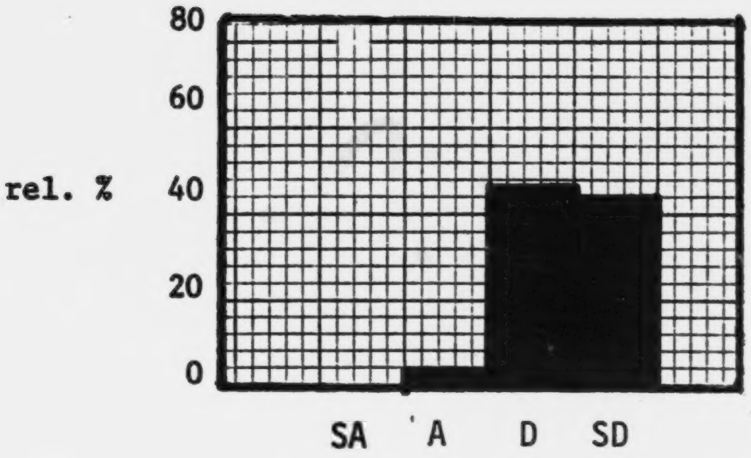


47. You think that teachers who take a number of field trips are considered lazy by the other teachers.



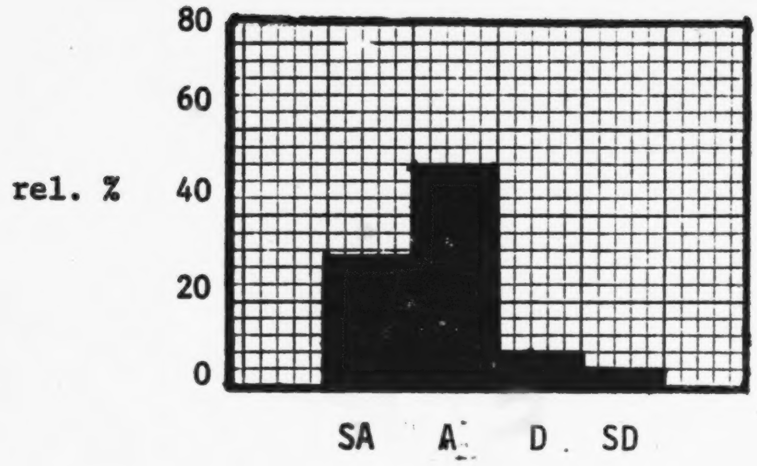
51. You think that frequent field trips by one class would cause the principal to question that teacher's teaching procedures.

Exhibit 3: Scale: Affective Concerns Associated with Educational Field Trips in General

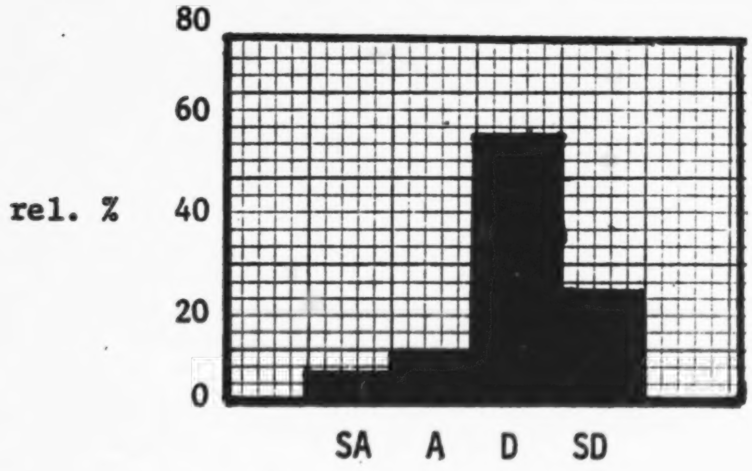


55. You think that teachers who take a number of field trips are considered "show-offs" by the other teachers.

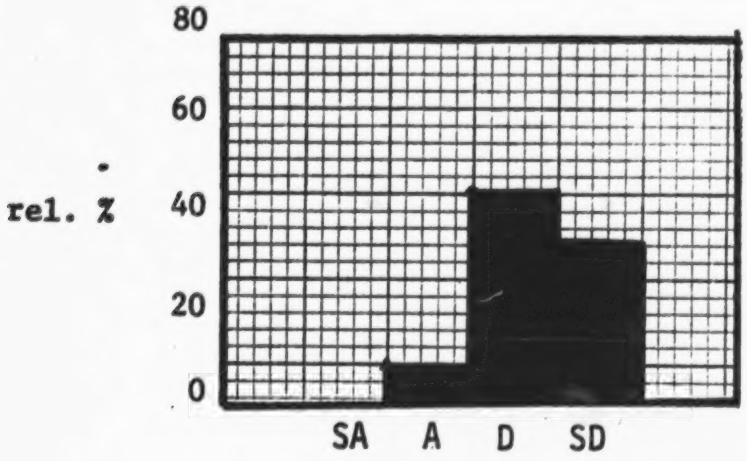
Exhibit 4: Scale: Utility and Management of Natural Science Trips



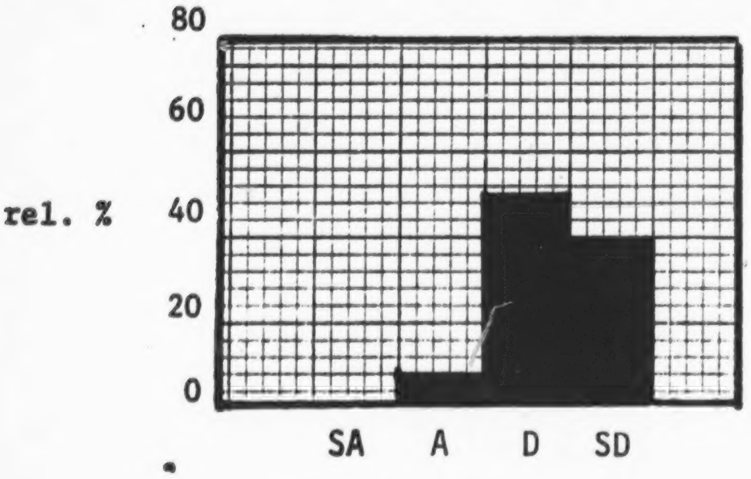
4. You are provided sufficient information about the nature, places, time, etc. concerning the Outdoor Natural Science Laboratory field trips.



8. The field trips scheduled through the Outdoor Natural Science Laboratory are not the ones you would like to take.

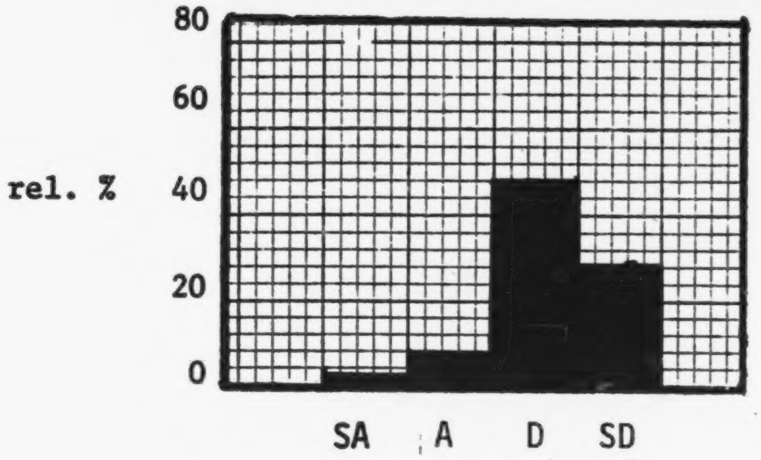


12. Science *concepts* taught by the teacher-naturalists by means of the Outdoor Natural Science Laboratory field trips could be taught by them as well or better in the classroom.

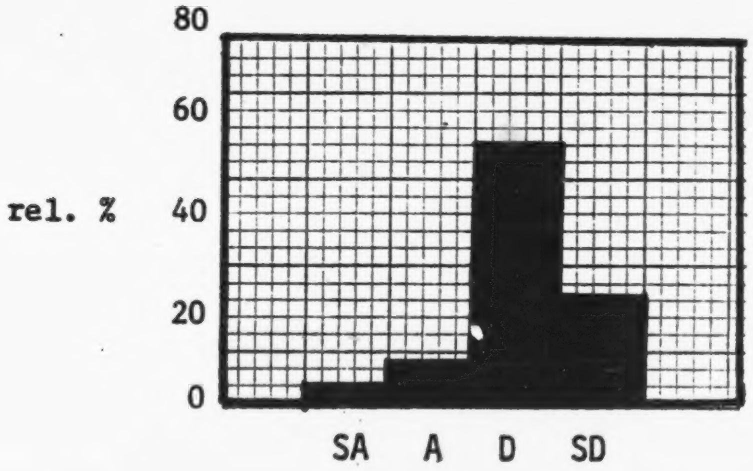


16. Science *information* taught by means of Outdoor Natural Science Laboratory field trips could be taught as well or better in the classroom.

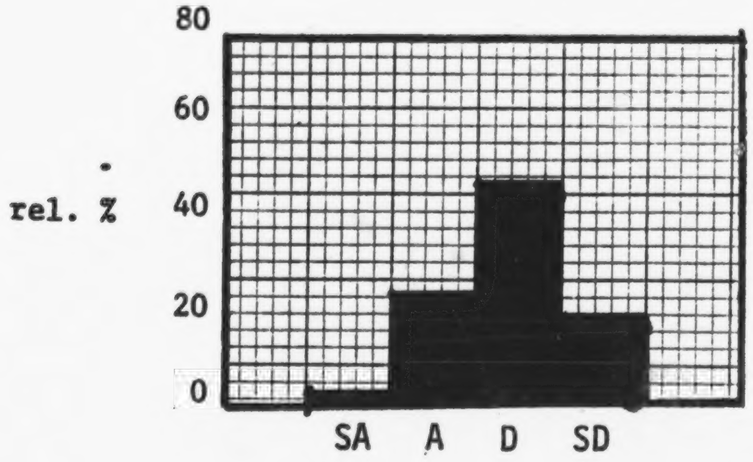
Exhibit 4: Scale: Utility and Management of Natural Science Trips



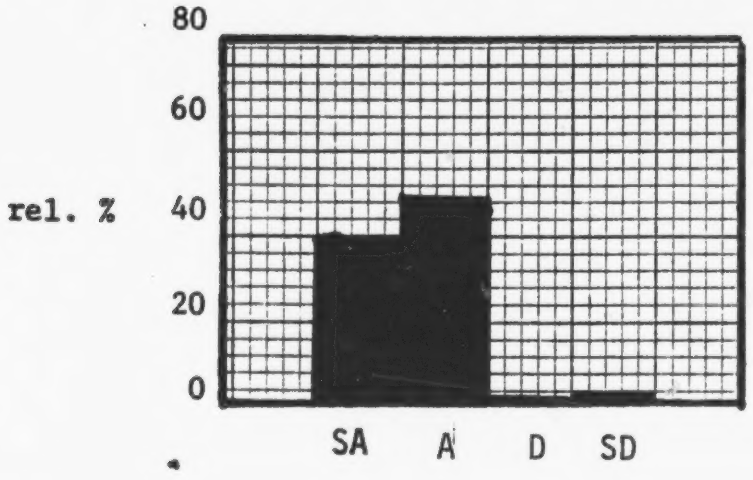
20. The actual Outdoor Natural Science Laboratory field trip experiences often have been disappointing because of inadequate presentation.



24. There is too much "red tape" involved in arranging Outdoor Natural Science Laboratory field trips.

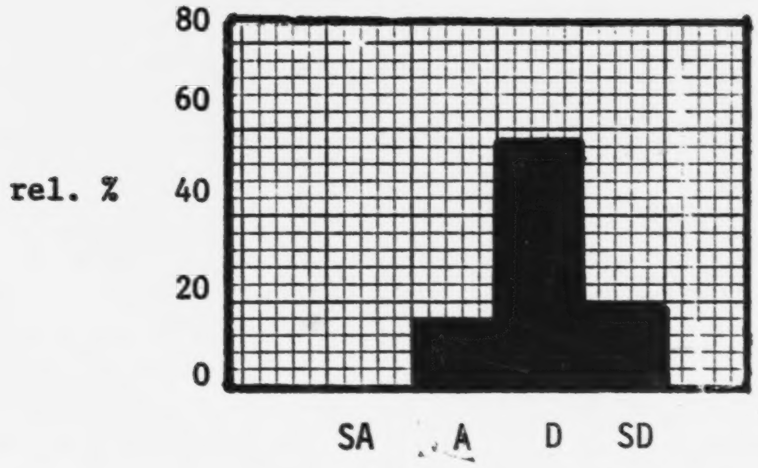


28. *You* feel that *you* could not teach science concepts by means of the Outdoor Natural Science Laboratory field trips as well as *you* teach them in the classroom.

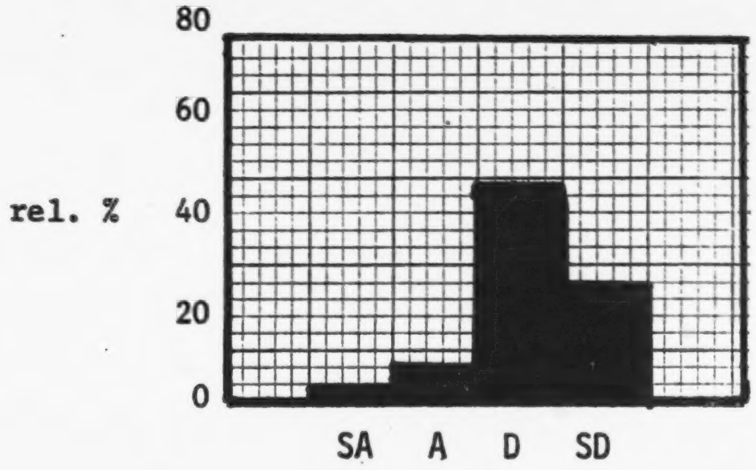


32. Pupils like to go on the Outdoor Natural Science Laboratory field trips.

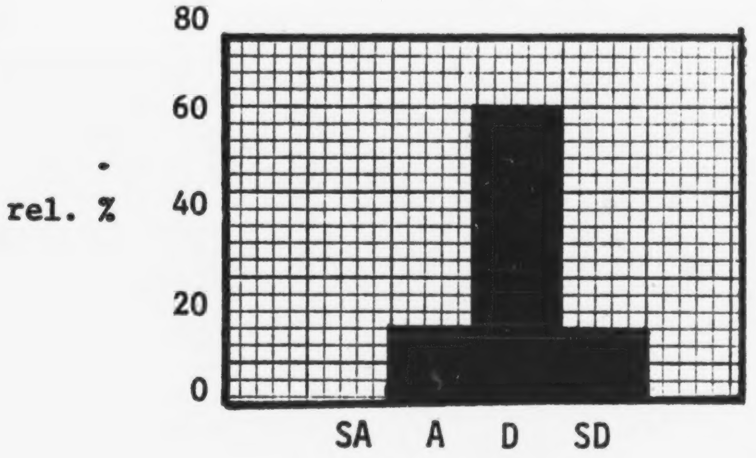
Exhibit 4: Scale: Utility and Management of Natural Science Trips



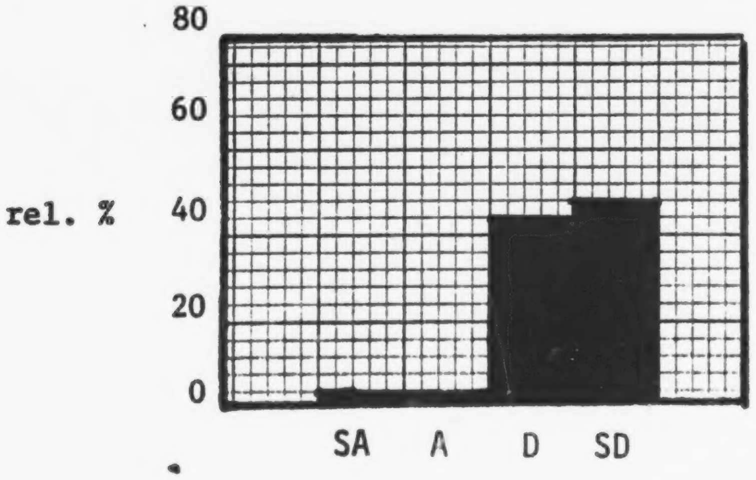
36. Classroom "lead-up" to field trips scheduled through the Outdoor Natural Science Laboratory is generally inadequate.



40. You find it particularly difficult to manage your class while on field trips scheduled through the Outdoor Natural Science Laboratory.

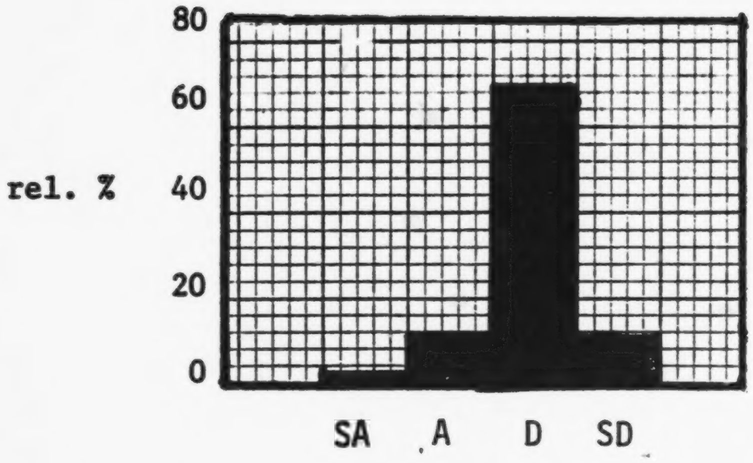


44. Classroom follow-up of the field trips scheduled through the Outdoor Natural Science Laboratory is generally inadequate.

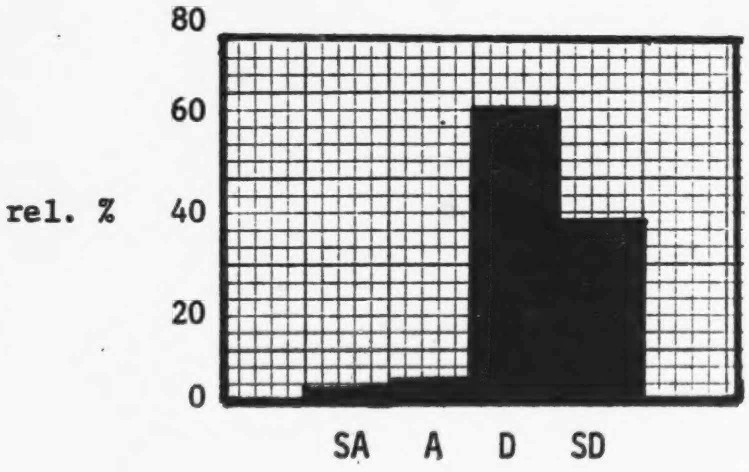


48. The Outdoor Natural Science Laboratory field trip coordinators are not sufficiently reliable.

Exhibit 4: Scale: Utility and Management of Natural Science Trips



52. The Outdoor Natural Science Laboratory field trips designed for your grade level are not available at a convenient time to fit in with your program.



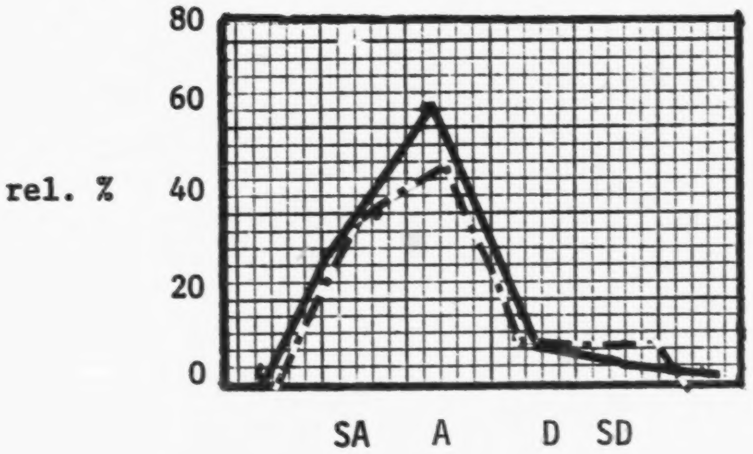
56. You are not interested in teaching the topics available from the Outdoor Natural Science Laboratory.

of-reference. The researchers term these items *image* items. An analysis comparing the image items as they apply to both field trips in general and to the ONSL trips in particular comprises the final discussion. Exhibit 5 presents these data in the form of a series of frequency polygons. In all cases, the solid line represents the item concerned with educational field trips in general while the dotted line represents the image item concerned with the ONSL trips.

Without exception, the basic trend for field trips in general is reflected in the trend for the ONSL series of trips. Although the shapes of the polygons are similar, four specific instances in which the figures diverge should be noted. They are:

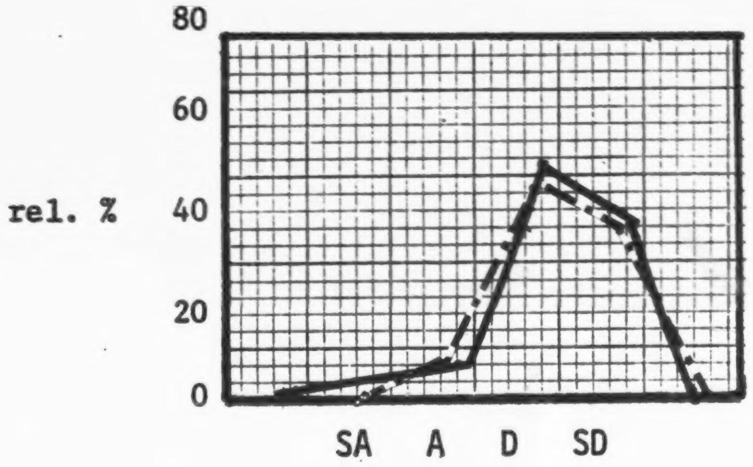
1. Somewhat fewer teachers feel that there is too much "red tape" involved in arranging ONSL trips.
2. Considerably more teachers are of the opinion that the ONSL trips are available at convenient times to fit teachers' programs.
3. The teacher-naturalists are perceived by more teachers as being more reliable than other field trip co-ordinators, guides, etc.
4. While the sample of teachers indicate that pupils like to go on ONSL field trips, this tendency is not perceived as strongly for these trips as for educational field trips in general.

Exhibit 5: Comparison of Image Items Applying to Both Educational Field Trips in General and ONSL Field Trips



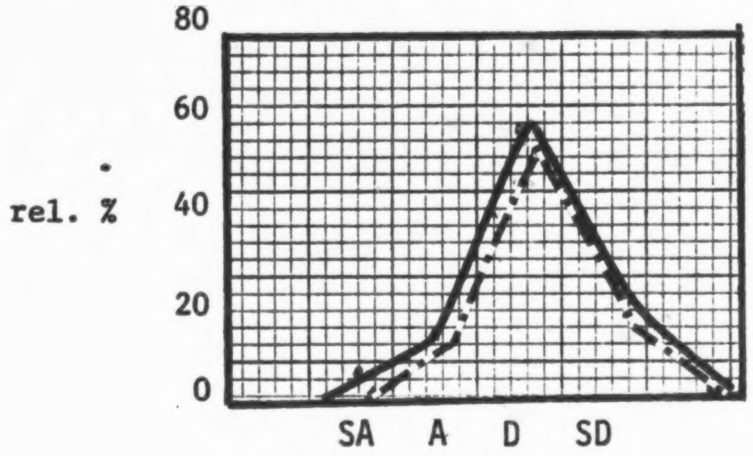
2. You are provided sufficient information about the nature, places, time, etc. concerning possible field trips. ——

4. You are provided sufficient information about the nature, places, time, etc. concerning the Outdoor Natural Science Laboratory field trips. — · — · —



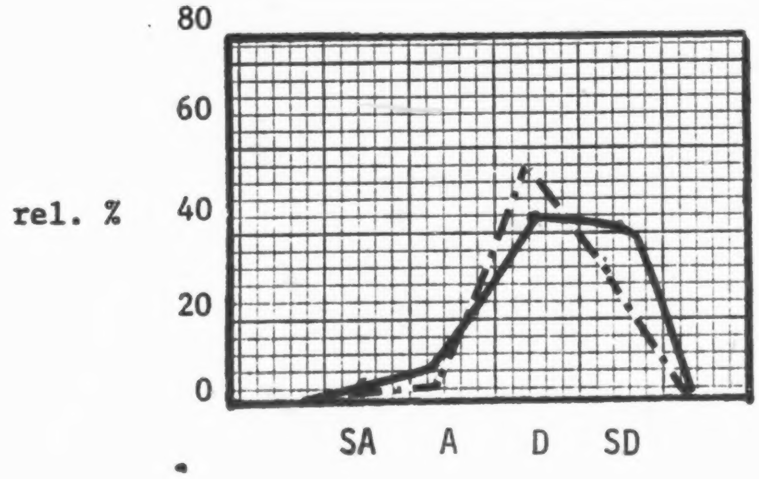
33. Concepts taught by means of field trips could be taught as well or better in the classroom. ——

12. Science *concepts* taught by the teacher-naturalists by means of the Outdoor Natural Science Laboratory field trips could be taught by them as well or better in the classroom. — · ·



21. Classroom "lead-up" to a field trip is generally inadequate. ——

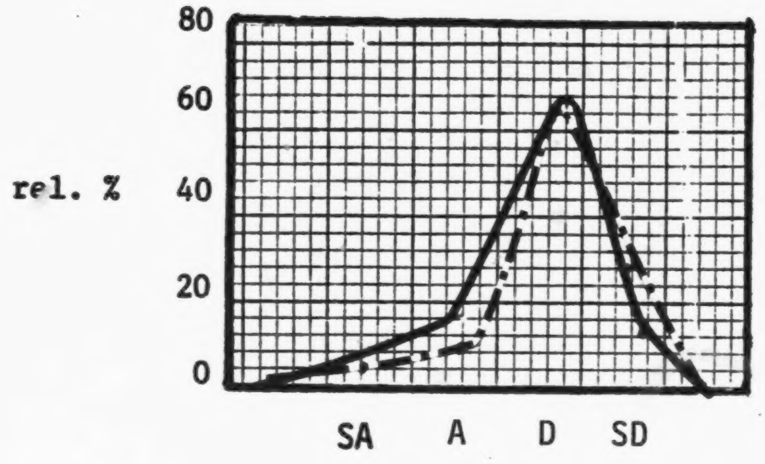
36. Classroom "lead-up" to field trips scheduled through the Outdoor Natural Science Laboratory is generally inadequate. — · — · —



15. You find it difficult to manage your class while on a field trip. ——

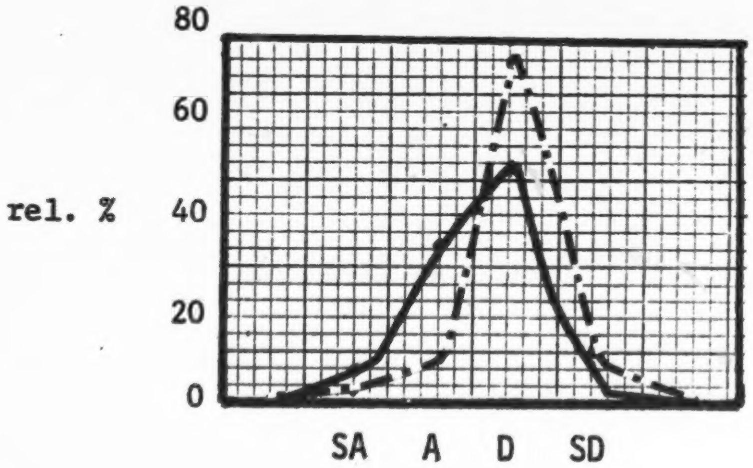
40. You find it particularly difficult to manage your class while on field trips scheduled through the Outdoor Natural Science Laboratory. · · — ·

Exhibit 5: Comparison of Image Items Applying to Both Educational Field Trips in General and ONSL Field Trips



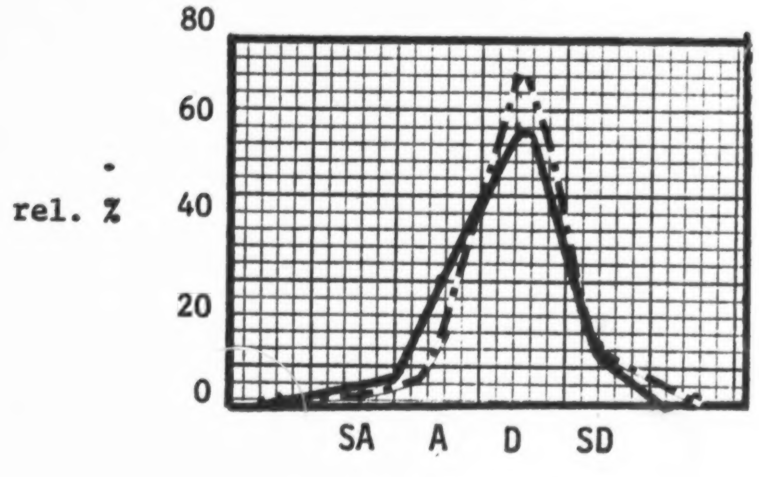
22. There is too much "red tape" involved in arranging field trips. ———

24. There is too much "red tape" involved in arranging Outdoor Natural Science Laboratory field trips. ·—·



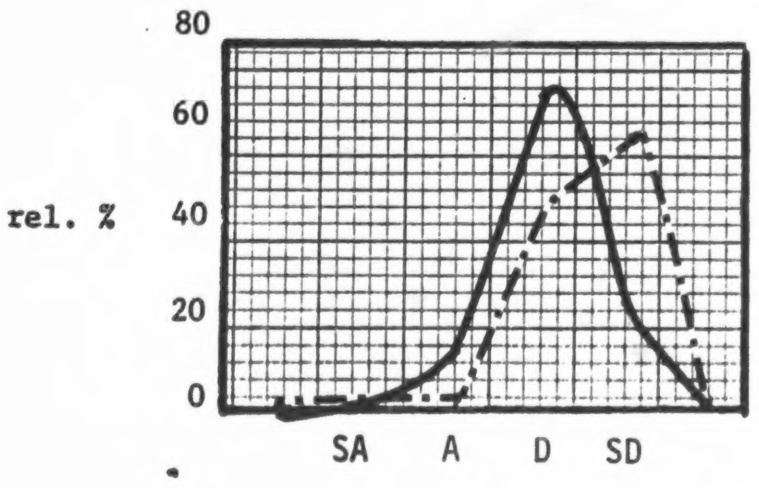
6. Often the object or event you want your class to see is not available at a convenient time to supplement your program. ———

52. The Outdoor Natural Science Laboratory field trips designed for your grade level are not available at a convenient time to fit in with your program. —·—·



41. Classroom follow-up of a field trip is generally inadequate. ———

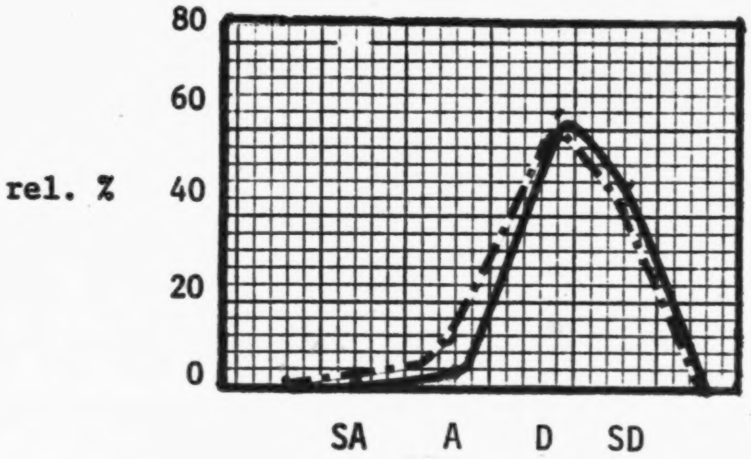
44. Classroom follow-up of the field trips scheduled through the Outdoor Natural Science Laboratory is generally inadequate. —·—·



26. Outside field trip coordinators (*e.g.*, museum and plant guides, teacher specialists, etc.) are not sufficiently reliable. ———

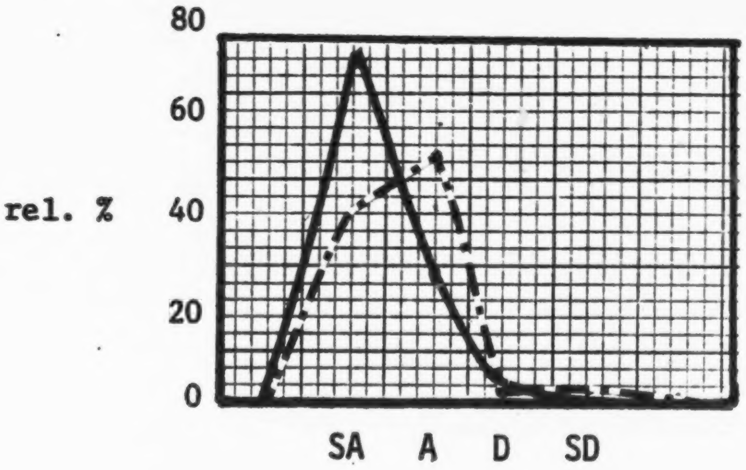
48. The Outdoor Natural Science Laboratory field trip coordinators are not sufficiently reliable. —·—·

Exhibit 5: Comparison of Image Items Applying to Both Educational Field Trips in General and ONSL Field Trips



25. Information taught by means of field trips could be taught as well or better in the classroom. ——

16. Science *information* taught by means of Outdoor Natural Science Laboratory field trips could be taught as well or better in the classroom. -·—·



37. Pupils like to go on field trips. ——

32. Pupils like to go on the Outdoor Natural Science Laboratory field trips. ·—··

Conclusions

This investigation consisted of analyses of the item results on the Field Trip Opinion scale. These results were reported by item, by scale, for the sample of 121 teachers.

Analyses revealed the following opinions toward educational field trips in general:

1. *In general, teachers strongly endorse the value of field trips for educational purposes.*
2. *Factors of this utility are: (a) providing for change in classroom routine, (b) effective procedure for presenting both concepts and knowledge, (c) providing unique experiences, (d) enhancing pupil enjoyment; and, to a lesser degree, (e) providing relief from the pressure of daily routine.*
3. *Pre-field trip instruction is seen as inadequate by over one-fourth the teachers.*
4. *The general management (e.g., scheduling trips, arranging transportation, reliability of co-ordinators, etc.) is generally perceived as adequate and seems to present no special problems to teachers.*
5. *Teachers did not consider the opinions of principals, parents, or other teachers to be considerations for utilizing field trips.*
6. *Concern for the safety of the class and legal responsibility for them was not a factor inhibiting teacher utilization of field trips.*
7. *Nearly one-third of the teachers expressed some doubt concerning their personal adequacy in conducting field trips.*

Additional analyses revealed the following opinions toward the ONSL field trips:

1. *They were seen as being useful for presenting science information and concepts.*
2. *Pre-field trip and follow-up instruction were considered to be adequate.*
3. *The teacher-naturalists were perceived as being reliable coordinators, and were deemed somewhat more reliable than coordinators and guides for typical field trips.*
4. *The trips were viewed as being well managed, with "good" presentations.*
5. *As perceived by teachers, the trips have been liked by pupils, although not to the extent as other types of field trips.*
6. *The teachers expressed interest in teaching the topics for which appropriate trips have been developed.*
7. *Teachers indicated that there seemed to be less "red tape" involved in arranging ONSL field trips than for other types of trips.*
8. *Considerably more often, teachers expressed the view that the ONSL field trips - as compared to other trips - were available at convenient times to fit teachers' schedules.*

APPENDIX A

Field Trip Opinion Scale

FIELD TRIP OPINION SCALE

Alvin P. Sokol
University City
School District

Jon C. Marshall
University of Missouri -
St. Louis

DIRECTIONS

This inventory consists of 56 items designed to sample your opinions about educational field trips. Since opinions are an individual matter, there are no right or wrong answers. Therefore, you should read each item carefully, mark your first reaction to the item, and then continue directly to the next item.

Do not write on this booklet. You are to mark your answers on a separate sheet which contains spaces for four responses per item. Mark one response for each item. The responses are to be marked *across* the answer sheet. Be sure that you record your choice in the appropriate position.

Do not skip any items. Be sure to shade answers completely and to erase completely.

If you STRONGLY AGREE with the statement,
blacken the space marked "A". . . . . ■ [B] [C] [D]

If you AGREE with the statement,
blacken the space marked "B". . . . . [A] ■ [C] [D]

If you DISAGREE with the statement,
blacken the space marked "C". . . . . [A] [B] ■ [D]

If you STRONGLY DISAGREE with the statement,
blacken the space marked "D". . . . . [A] [B] [C] ■

PLEASE COMPLETE ALL PERSONAL DATA REQUESTED ON THE ANSWER SHEET. THIS INFORMATION IS NECESSARY FOR SORTING THE RESPONSES INTO MEANINGFUL GROUPS.

A - STRONGLY AGREE
B - AGREE
C - DISAGREE
D - STRONGLY DISAGREE

---

1. Field trips are desirable because they provide for an occasional change in classroom routine.

2. You are provided sufficient information about the nature, places, time, etc. concerning possible field trips.

3. You find that the behavior of your class compares favorably with that of students from other schools who are on the same field trip.

4. You are provided sufficient information about the nature, places, time, etc. concerning the Outdoor Natural Science Laboratory field trips.

5. Field trips are difficult to justify educationally.

6. Often the object or event you want your class to see is not available at a convenient time to supplement your program.

7. Pupils like to go on field trips to the art museum.

8. The field trips scheduled through the Outdoor Natural Science Laboratory are not the ones you would like to take.

9. Field trips are effective as a teaching device.

10. The field trips you think are most useful seem to fall at about the same time of year.

11. You embark on field trips with no doubts concerning your personal adequacy in the situation.

12. Science concepts taught by the teacher-naturalists by means of the Outdoor Natural Science Laboratory field trips could be taught by them as well or better in the classroom.

13. Field trips provide unique experiences.

14. You often decide not to schedule field trips due to the difficulty of fitting them into your teaching schedule.

15. You find it difficult to manage your class while on a field trip.

16. Science information taught by means of Outdoor Natural Science Laboratory field trips could be taught as well or better in the classroom.

17. Field trips provide relief from the pressure of daily classroom teaching.

18. You have been informed of the routine to follow in scheduling field trips.

19. You feel that pupils become too noisy on field trips.

20. The actual Outdoor Natural Science Laboratory field trip experiences often have been disappointing because of inadequate presentation.

21. Classroom "lead-up" to a field trip is generally inadequate.

A - STRONGLY AGREE
B - AGREE

C - DISAGREE
D - STRONGLY DISAGREE

---

22. There is too much "red tape" involved in arranging field trips.

23. You think that the principal will evaluate you more postively if you take your class on field trips.

24. There is too much "red tape" involved in arranging Outdoor Natural Science Laboratory field trips.

25. Information taught by means of field trips could be taught as well or better in the classroom.

26. Outside field trip coordinators (e.g., museum and plant guides, teacher specialists, etc.) are not sufficiently reliable.

27. You think that teachers who take a number of field trips are considered "creative" by the other teachers.

28. You feel that you could not teach science concepts by means of the Outdoor Natural Science Laboratory field trips as well as you teach them in the classroom.

29. Information taught by means of art museum field trips could be taught as well or better in the classroom.

30. You are provided sufficient information about the nature, places, time, etc. concerning the prescheduled field trips to the art museum.

31. The possibility that others might consider you legally responsible if a child should get hurt on a field trip has prevented you from scheduling some field trips.

32. Pupils like to go on the Outdoor Natural Science Laboratory field trips.

33. Concepts taught by means of field trips could be taught as well or better in the classroom.

34. The actual field trip experience often has been disappointing because of the lack of adequate presentation.

35. You think that parents consider you a better teacher if you take field trips.

36. Classroom "lead-up" to field trips scheduled through the Outdoor Natural Science Laboratory is generally inadequate.

37. Pupils like to go on field trips.

38. Appropriate transportation is not available for field trips.

39. Pupils' behavior is often embarrassing on field trips.

40. You find it particularly difficult to manage your class while on field trips scheduled through the Outdoor Natural Science Laboratory.

41. Classroom follow-up of a field trip is generally inadequate.

A - STRONGLY AGREE
B - AGREE
C - DISAGREE
D - STRONGLY DISAGREE

---

42. Bus transportation is generally too uncomfortable for the enjoyment of of field trips.

43. Concern for the safety of the pupils has prevented you from scheduling some field trips.

44. Classroom follow-up of the field trips scheduled through the Outdoor Natural Science Laboratory is generally inadequate.

45. The field trips scheduled through the art coordinator are not the ones you would like to take.

46. Prescheduled (i.e., not teacher initiated) field trips occur at inappropriate times to supplement your unit of study properly.

47. You think that teachers who take a number of field trips are considered lazy by the other teachers.

48. The Outdoor Natural Science Laboratory field trip coordinators are not sufficiently reliable.

49. Field trips are not effective as a teaching device.

50. The art museum field trips you think are most useful seem to fall at the wrong time of year.

51. You think that frequent field trips by one class would cause the principal to question that teacher's teaching procedures.

52. The Outdoor Natural Science Laboratory field trips designed for your grade level are not available at a convenient time to fit in with your program.

53. Field trips are useful.

54. Factors beyond your control (e.g., rain, illness, poor guides) affect your willingness to schedule field trips.

55. You think that teachers who take a number of field trips are considered "show-offs" by the other teachers.

56. You are not interested in teaching the topics available from the Outdoor Natural Science Laboratory.

NAME__________ AGE__________ SEX (M or F):__________ SCHOOL__________ GRADE LEVEL TAUGHT__________

NO. YRS. TAUGHT (Inclusive)__________ NO. YRS IN DIST.(Inclusive)__________ HIGHEST DEGREE ATTAINED__________

Check Approximate Number of Semester Hours* In Each of the Following Areas.

*Semester hrs.= 2/3 Quarter hrs.

	Language Arts	Human-ities	Math Science
0-6	[ ]	[ ]	[ ]
7-12	[ ]	[ ]	[ ]
13-18	[ ]	[ ]	[ ]
19-24	[ ]	[ ]	[ ]
25-30	[ ]	[ ]	[ ]
30 +	[ ]	[ ]	[ ]

1. [A] [B] [C] [D]   2. [A] [B] [C] [D]   3. [A] [B] [C] [D]   4. [A] [B] [C] [D]
5. [A] [B] [C] [D]   6. [A] [B] [C] [D]   7. [A] [B] [C] [D]   8. [A] [B] [C] [D]
9. [A] [B] [C] [D]   10. [A] [B] [C] [D]   11. [A] [B] [C] [D]   12. [A] [B] [C] [D]
13. [A] [B] [C] [D]   14. [A] [B] [C] [D]   15. [A] [B] [C] [D]   16. [A] [B] [C] [D]
17. [A] [B] [C] [D]   18. [A] [B] [C] [D]   19. [A] [B] [C] [D]   20. [A] [B] [C] [D]

21. [A] [B] [C] [D]   22. [A] [B] [C] [D]   23. [A] [B] [C] [D]   24. [A] [B] [C] [D]
25. [A] [B] [C] [D]   26. [A] [B] [C] [D]   27. [A] [B] [C] [D]   28. [A] [B] [C] [D]
29. [A] [B] [C] [D]   30. [A] [B] [C] [D]   31. [A] [B] [C] [D]   32. [A] [B] [C] [D]
33. [A] [B] [C] [D]   34. [A] [B] [C] [D]   35. [A] [B] [C] [D]   36. [A] [B] [C] [D]
37. [A] [B] [C] [D]   38. [A] [B] [C] [D]   39. [A] [B] [C] [D]   40. [A] [B] [C] [D]

41. [A] [B] [C] [D]   42. [A] [B] [C] [D]   43. [A] [B] [C] [D]   44. [A] [B] [C] [D]
45. [A] [B] [C] [D]   46. [A] [B] [C] [D]   47. [A] [B] [C] [D]   48. [A] [B] [C] [D]
49. [A] [B] [C] [D]   50. [A] [B] [C] [D]   51. [A] [B] [C] [D]   52. [A] [B] [C] [D]
53. [A] [B] [C] [D]   54. [A] [B] [C] [D]   55. [A] [B] [C] [D]   56. [A] [B] [C] [D]

UT	MT	AF	NS

PLEASE TURN OVER FOR QUESTIONS (57 - 59)

57. Rank in order of importance, as you see them for your grade level, the following subject areas. Place the numeral *1* next to the most important area, *2* next to the second most important, and so on.

_____ Music
_____ Penmanship
_____ Health
_____ Science
_____ Spelling
_____ Mathematics
_____ Social Studies
_____ Physical Education
_____ Reading
_____ Art
_____ English

58. Rank in the order of importance, as you see them for your grade level the eleven subareas of science, most of which are taught at one time or another in the elementary school. Place the numeral *1* next to the most important area, *2* next to the second most important, and so on.

_____ Chemistry (including states of matter; atoms and molecules; elements, compounds and mixtures: chemical change; etc.)
_____ Botany (including seeds, growing plants, trees, flowers [types, parts], non-flowering plants, etc.)
_____ Space (including technology, rockets, space travel)
_____ Zoology (including classification [mammals, birds, etc.] insect life, life cycles, etc.)
_____ Astronomy (including stars, solar system, constellations, etc.)
_____ Human Body (including systems of the body, sexuality, etc.)
_____ Weather (including elements [wind, rain, temperature atmospheric pressure]; clouds; forecasting; climates, etc.)
_____ Ecology (including "food chains", adaptation to environment, habitats, interdependence, etc.)
_____ Physics (including machines; energy [heat, light, electricity] etc.
_____ Conservation (including soil, fuels, water, wildlife, etc.

59. List below all the field trips you have taken or plan to take during the 1968-69 school year.

SITE	CURRICULUM AREA	APPROXIMATE DURATION (in hours)	**MONTH TAKEN**	**CHECK IF FIELD TRIP IS "PRESCHEDULED;" LEAVE BLANK IF TEACHER-INITIATED**
1.				[ ]
2.				[ ]
3.				[ ]
4.				[ ]
5.				[ ]

APPENDIX B

Item Analysis Data

TABLE 20

Item Analysis Data, Field Trip Opinion Scale

Item				Response						
	A		B		C		D		Omits	
	#	%	#	%	#	%	#	%	#	%
1	27	22.31	46	38.0	33	27.2	15	12.3	0	
2	29	23.9	75	61.9	14	11.5	3	2.4	0	
3	47	38.8	60	49.5	12	9.9	2	1.6	0	
4	38	31.4	58	47.9	12	9.9	9	7.4	4	3.3
5	4	3.3	4	3.3	29	23.9	83	68.5	1	.8
6	9	7.4	40	33.0	60	49.5	10	8.2	2	1.6
7	31	25.6	76	62.8	11	9.0	3	2.4	0	
8	4	3.3	12	9.9	71	58.6	32	26.4	2	1.6
9	88	66.9	31	25.6	2	1.6	0		0	
10	5	4.1	24	19.8	76	62.8	16	13.2	0	
11	18	14.8	56	46.2	40	33.0	7	5.7	0	
12	2	1.6	11	9.0	59	48.7	48	39.6	1	.8
13	68	56.1	47	38.8	5	4.1	0		1	.8
14	4	3.3	25	20.6	61	50.4	31	25.6	0	
15	5	4.1	10	8.2	54	44.6	51	42.1	1	.8
16	1	.8	13	10.7	60	49.5	46	38.0	1	.8
17	8	6.6	38	31.4	45	37.1	30	24.7	0	
18	28	23.1	71	58.6	16	13.2	5	4.1	1	.8
19	5	4.1	19	15.7	71	58.6	26	21.4	0	
20	5	4.1	10	8.2	63	52.0	38	31.4	5	4.1
21	5	4.1	29	23.9	65	53.7	22	18.1	0	
22	13	10.7	19	15.7	69	57.0	19	15.7	1	.8
23	4	3.3	20	16.5	60	49.5	36	29.7	1	.8

TABLE 20 (con't.)

Item	Response A		B		C		D		Omits	
	#	%	#	%	#	%	#	%	#	%
24	5	4.1	11	9.0	71	58.6	30	24	4	
25	0		3	2.4	68	56.1	50	41.5	0	
26	1	.8	11	9.0	80	66.1	28	23.3	1	.8
27	4	3.3	18	14.8	72	59.5	26	21.4	1	.8
28	3	2.4	29	23.9	64	52.8	21	17.3	4	3.3
29	1	.8	1	.8	59	48.7	58	47.9	2	1.6
30	18	14.8	67	55.3	25	20.6	6	4.9	5	4.1
31	2	1.6	11	9.0	58	47.9	48	39.9	2	1.6
32	50	41.3	63	52.0	1	.8	3	2.4	4	3.3
33	0		9	7.4	68	56.1	43	35.5	1	.8
34	1	.8	23	19.0	76	62.8	20	16.5	1	.8
35	2	1.6	36	21.4	66	54.5	16	13.2	1	.8
36	3	2.4	21	17.3	69	57.0	24	19.8	4	3.3
37	86	71.0	33	27.2	1	.8	0		1	.8
38	10	8.2	20	16.5	60	49.5	30	24.7	1	.8
39	5	4.1	16	13.2	71	58.6	28	23.1	1	.8
40	2	1.6	7	5.7	67	53.3	40	33.0	5	4.1
41	2	1.6	32	26.4	69	57.0	17	14.0	1	.8
42	2	1.6	8	6.6	65	53.7	46	38.0	0	
43	1	.8	11	9.0	66	54.5	43	35.5	0	
44	1	.8	18	14.8	83	68.5	16	13.2	3	2.4
45	3	2.4	19	15.7	71	58.6	21	17.3	7	5.7
46	6	4.9	34	28.0	63	52.0	12	9.9	6	4.9
47	2	1.600	3	2.400	65	53.700	51	42.100	0	
48	3	2.400	2	1.600	51	42.100	62	51.200	3	2.400

TABLE 20 (con't.)

Item	Response									
	A		B		C		D		Omits	
	#	%	#	%	#	%	#	%	#	%
49	2	1.600	2	1.600	40	33.000	77	63.000	0	
50	3	2.400	17	14	75	61.900	21	17.300	5	4.100
51	2	1.600	11	9.00	76	62.800	32	26.400	0	
52	2	1.600	14	11.500	85	70.200	16	13.200	4	3.300
53	82	67.700	31	25.600	5	4.100	3	2.400	0	
54	3	2.400	12	9.900	76	62.800	30	24.700	0	
55	2	1.600	9	7.400	55	45.400	55	45.400	0	
56	3	2.400	5	4.100	70	57.800	41	33.800	2	1.600

END
4 9 71